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ORIGINAL ARTICLES

ON GNATHOSTATIC DIAGNOSIS IN ORTHODONTICS*

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BEFORE reading my paper to you, allow me to thank your society very much for the invitation with which I was honored. We Germans highly respect American orthodontics and realize how much we owe to it. I, therefore, appreciate so much more being permitted to present the modest results of my work.

But modest as these results are, they are nevertheless quite extensive; it will, consequently, not be easy for me to explain myself fully in the short time of my lecture, nor will it be easy for you to take in and reflect upon all that I tell you. Pray be indulgent both with my paper and the imperfection you will find in my pronunciation.

And now, coming to my topic, I wish to relate to you how, after many years of assiduous investigation and study, I came to find a new system for diagnosing the anomalies of the teeth and jaws.

You all know very well Angle's classification, which up to now has also been the basis of diagnosis in Germany. What has been problematical in Angle's system was not the division in three classes on the basis of occlusion, but Angle's assertion that, in general, the upper first molars had a permanent place, so that they might represent, as it were, the starting point of measurement. I have made many measurements on the basis of Angle's doctrine and found that it is wrong. I shall show you later on, how these researches were made. It is a well known fact that not only in Germany, but also in America many investigators have already contradicted the dogma of the constancy of the molars. In spite of it, Angle's system has met with

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great approval, and the theoretical contradiction has not succeeded in contesting its practical usefulness.

Angle himself was surely convinced that his assertion represented a real truth, a natural law. I have reflected a great deal upon the character of this dogma and have found it to be a fiction. Such a fiction is in question when some one makes a temporary statement, in order to be able to come to a practical conclusion at all, since it is impossible to recognize the real and natural state of affairs on account of its complication. Such a fiction consequently cannot claim any scientific truth, nor does it require any, but it can only claim the greatest possible usefulness. And it will now also be understood, why Angle's system has met with such great approval. The dogma of the molars is indeed scientifically wrong, but it is very useful in a practical way, for with its help it is easily possible to get the great variety of the malocclusions into a certain order and a certain view.

You have perhaps read the book, so very well known and appreciated in Germany, by the philosopher Vaihinger, entitled, "Die Philosophie des Als-Ob" (The Philosophy of As-If). In this book an accurate definition and theory of the fictions is given, and it is proved that a great many doctrines and systems of science, especially of natural science, rest upon mere fictions. And so the dogma of the constancy of the molars is also a mere fiction, which may be characterized with the following words: We do not know whether the molars are always in their right place but as we need a starting point, in order to be able to make a diagnosis and a plan of treatment, we imagine them, *as if* they were standing in their right place. There is nothing to be said against this fiction as a practical device of thinking, as long as there is no better fiction, that is to say, one more useful. It is clear that a case of Class II, if it be treated according to the arguments of that fiction, must surely be a failure, if the maxillary molars are not in the right position, i. e. too far forward, while the mandibular molars have their proper place. With the help of these methods of measurement, which I shall demonstrate to you afterwards, it has been proved that in about half of the cases of "Class II," the maxillary molars are not in their proper place and that there are, consequently, many cases where it is not the mandible that must be moved forward, but the maxillary dental arch that must be moved occipitally.

Unfortunately time does not allow me to go on explaining this part of my work, demonstrating it on a vast material. I must rather begin at once with the chief and positive part of my paper.

It will be best to tell you first the general ideas of the new methods of diagnosis and illustrate them by figurative demonstration, and afterwards explain the sense of the new system. You will then see that the new system also makes use of a fiction, which, however, is quite different from Angle's and surely much more useful.

The exact procedure of making a diagnosis rests upon cephalometric principles; that is to say, the teeth are not studied and measured in themselves, but in their relation to the head or skull. It is not practical to take the necessary measurements on the living; it is much better to make reproductions, for thus the measurements can be made in a more convenient and

surer way. It is also of special advantage, as with the help of a reproduction a very clear and plastic view of the patient and of his teeth is obtained and it may be preserved for future control, which, of course, with measurements on a living person will never be possible.

We need two kinds of reproductions; one of the teeth, the other of the head—that is to say, only of that part important for us. The first we get by the gnathostat model, the other by the photostat photo.

I am going to speak to you first on the qualities of a gnathostat model. Such a model is marked after three determined planes of the head or skull. The upper plane of the model is identical with the so-called "Frankfort horizontal plane" or, as it is more shortly called, the ear-eye plane. Imagine this plane to be a section made through four points of the head, viz., the two orbitalia or eye-points and the two tragia, or ear-points; the former are situated on the lower edge of the orbit just below the pupil, if the patient

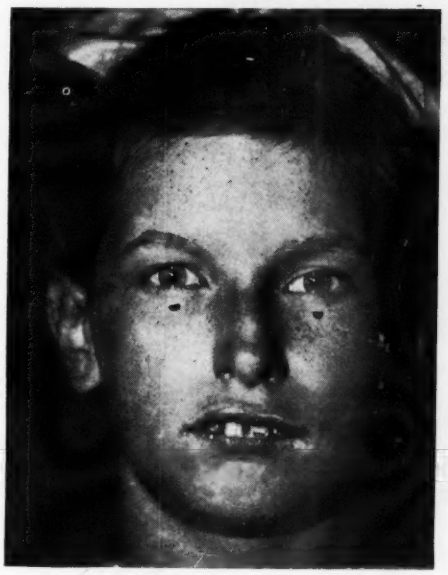

Fig. 1.

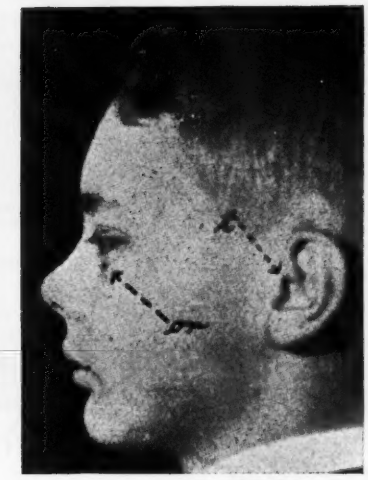

Fig. 2.

is looking straight ahead. The ear-points are situated on the upper end of the tragus. (See Figs. 1 and 2.) This ear-eye plane is, therefore, of great importance, and has for the last forty years been of great significance also in anthropology, on account of its being the physiologic horizontal plane; that is to say, if somebody holds his head erect in equilibrium, that plane is absolutely horizontal. It is clear, that holding the head in such a position, you will get a right impression of the esthetic effect of an anomaly. But of much more importance is the fact that we can only make measurements when all the heads and all the teeth are marked alike.

However this one plane is not sufficient. We have always been accustomed to measure bodily objects by three dimensions, and we must also apply the same principle to the teeth. We need, therefore, two more planes, and all three planes together must have the mathematical quality of being rectangular, that is to say, they must all stand at right angles to one another.

The second plane I am going to speak about is the median-sagittal plane, which also may be called symmetry plane, because a section made in this plane through the head will separate it into two nearly equal parts. For our purpose it is best to make this cut through the raphé palati, perpendicular to the ear-eye plane. The whole raphé is not used from front to back, but only two points as far occipital as possible.

Two of my students have proved by accurate measurements on 120 skulls, that this so-called raphé-median plane is in 80 per cent of these cases in

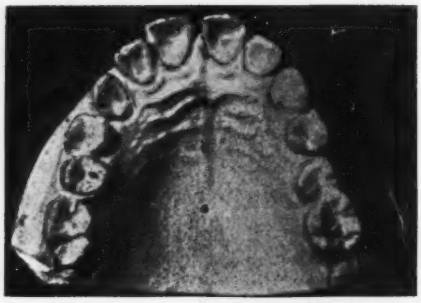

Fig. 3.

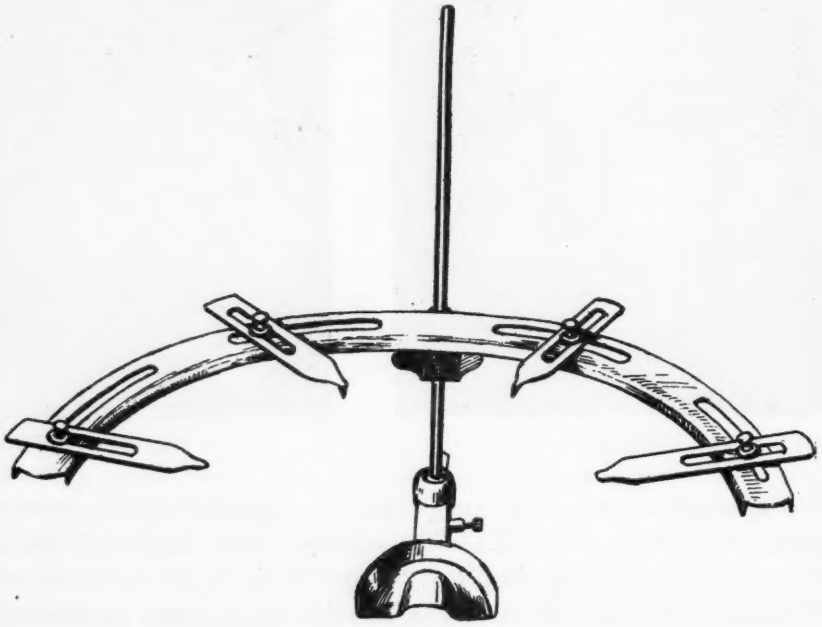

Fig. 4.

conformity with the median plane of the skull, going through two points of the basis of the skull, namely the basion and the nasion, and which, needless to say, can be marked on the skull only. You will see in Fig. 3 the two points marked on the raphé.

The third plane is the so-called orbital plane, recently indicated by me, and, according to my judgment, the most important for us, as you will soon see. This plane intersects the two eye-points and stands perpendicular, both to the ear-eye plane and to the raphé-median plane; it is, consequently, a

frontal plane, with the help of which we can measure the sagittal anomalies. You can see in Fig. 13 the orbital plane drawn around the model.

I am now going to show you on these pictures, how such a gnathostat model is made and then I will explain to you how a diagnosis is made with its help.

We start by taking a gnathostat impression of the patient. The impression tray is first filled with Stent's composition and then introduced into the mouth. The tray has a rectangular handle upon which there is an accurately fitting casing with a screw, so that the casing can be fixed, but always in the same position. A ball-joint with a long metal rod is fastened to this. On this rod we now fasten the most important part of the apparatus, the bow with the pointers (Fig. 4). It is movable upwards and downwards by means of a tube, which is always standing at right angles to the rod and can be fixed

Fig. 5.

in any height by means of a screw. The bow has four very easily movable pointers, but only in the plane of the bow. The tray with the compound is pressed against the teeth by a person standing behind the patient, so that the tray cannot be moved from its place by the weight of the gnathostat —which, by the way, is not heavy—whereupon the latter is fixed on the handle of the tray. Then the pointer-bow must be directed in such a way, that the four pointers are showing to the four skin points, through which the ear-eye plane is passing. This demands certain manipulations which are easily acquired. In my practical demonstration later on, I shall show you that minutely. After the pointers have been fixed, it is necessary and very important to press the two front pointers, that is to say, the orbital pointers, as tightly as possible against the bone pointers, so that the skin is somewhat pressed. Of course, the patient must not be made uncomfortable. In order to prevent the pointers gliding into the orbit, they have a short vertical rib in front. The orbital points must, by the way, be marked on the skin

before the impression is taken. This is best done with small pieces of black paper, gummed and stuck on with pincers. The whole setting of the bow and pointers is very quickly done and never takes more than the time re-

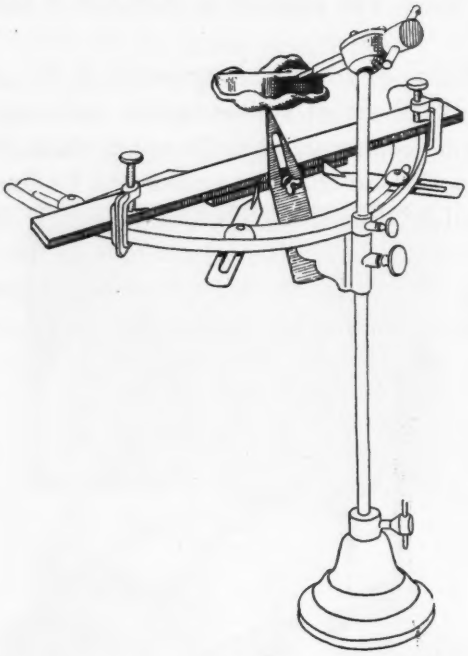

Fig. 6.

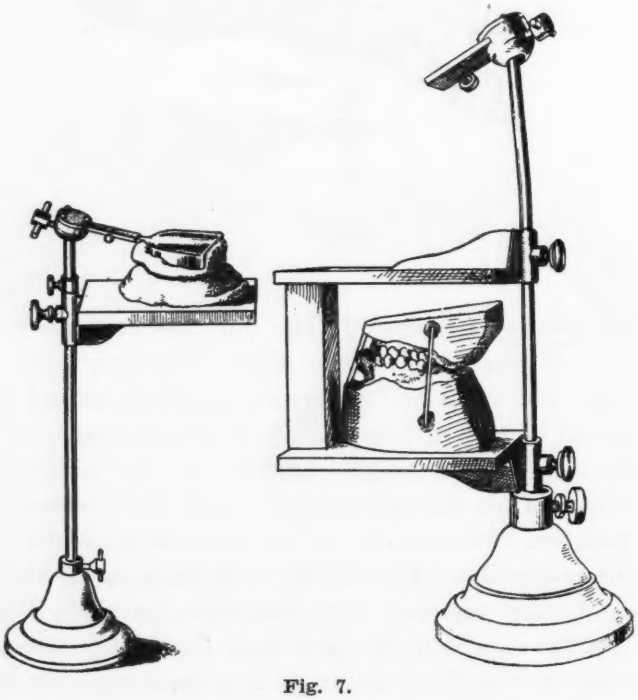

Fig. 7.

quired for the impression mass to get hard. The patient is not troubled in the least either. The setting once finished, all screws must be well fixed, whereupon the gnathostat is detached from the tray-handle and the impres-

sion tray removed from the mouth. Now the gnathostat impression is finished. The next manipulation consists in joining the tray again with the gnathostat just as before, and putting the apparatus upside down in a stand. Now two adjustments must be made: first, a small connecting-ring must be moved down to the pointer-bow and fixed with a screw; second, it is necessary to project the orbital plane upon the impression. For this purpose we use the so-called orbital marker, which consists of a strong metal rod, placed on

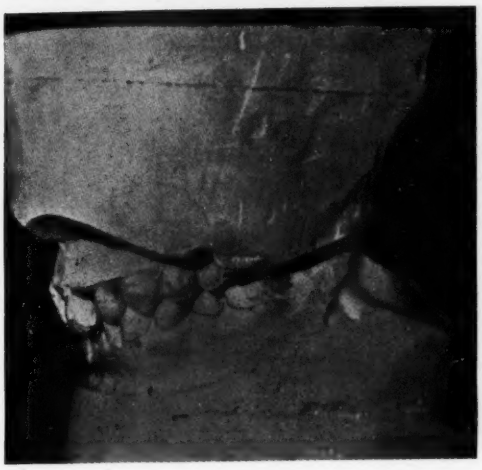

Fig. 8.

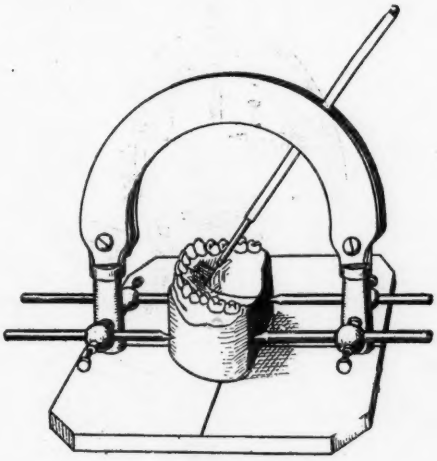

Fig. 9.

the pointer-bow in such a way as to lean against the ribs of the orbital pointers. You will remember that these ribs touched exactly the orbital points of the patient. In the middle of the measuring beam there is fastened an accurate rectangular pointer, movable upwards as well as downwards, but always in the same plane. With this pointer, we are enabled to make a notch in the palatal part of the impression, and this marking is just the projection of the orbital plane, for you know, I am sure, that the pointer moves exactly in that plane.

The model is now made in the laboratory. Instead of the pointer-bow a metal plate is used, which, of course, is identical with the ear-eye plane of

the patient. The space between this plate and the impression is filled with plaster in the usual way. When the impression mass has hardened and has been removed, we have an upper model, the base of which corresponds to the ear-eye plane.

The lower impression has been taken on the patient with an ordinary tray and cast as usual. It is then put together with the upper impression in the natural occlusion and fixed with wax by means of some small wood sticks. The two models are now placed upside down on the metal plate, already described; then some mixed plaster is put upon it and from above

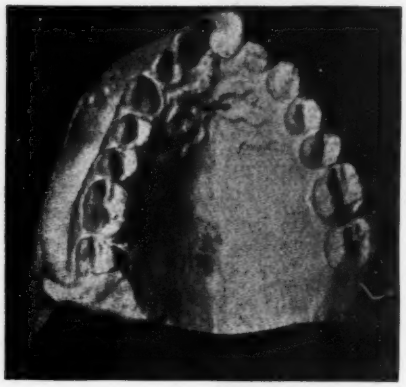

Fig. 10.

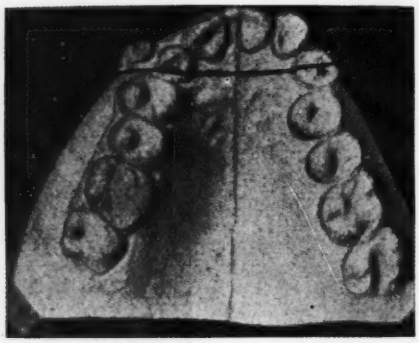

Fig. 11.

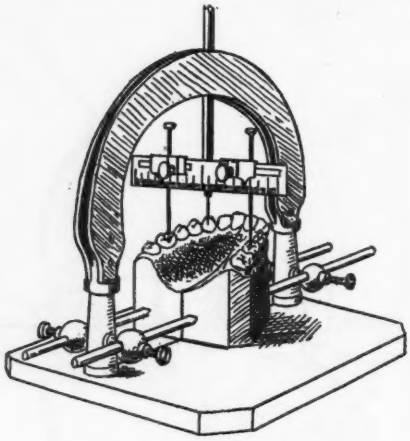

Fig. 12.

a second plate is pushed down to such a distance as to have two plates exactly eight cm. from each other (Fig. 7). This distance can easily be controlled by placing a little wooden stick eight cm. in length between them. Now the model is finished as far as you see it in Fig. 8. The upper and lower bases are parallel and at a distance of eight cm. from each other.

The next problem is to transfer the median plane and the orbital plane to the model. For this we use a special instrument, the so-called symmetrograph. Its arrangement can be distinctly seen in the picture. The metal pencil can be moved only in one plane and exactly perpendicular to the base-plate. The upper model is put on this plate with its base turned until the point of the metal pencil touches at least two points of the posterior raphé,

which have purposely been marked. Then the model is fixed in position with the four screw pins. Now we can readily draw a line round the model with the metal pencil and this line being situated in the desired raphé-median plane, it passes through the raphé and is perpendicular to the ear-eye plane.

There yet remains the orbital plane. It is marked in the same way with the symmetrograph, only the model must be turned to ninety degrees and the metal pencil must be adjusted on the orbital marking, which we made previously with the pointer of the orbital marker (Figs. 10, 11).

In Fig. 12 you see once more the symmetrograph, but with an important auxiliary instrument, the sliding compass. This is a scale that can be pushed at right angles to the metal pencil and to the raphé-median plane, and provided with a screw. It carries two movable sledges with likewise movable perpendicular needles. The points of these needles are adjusted into occlusal

Fig. 13.

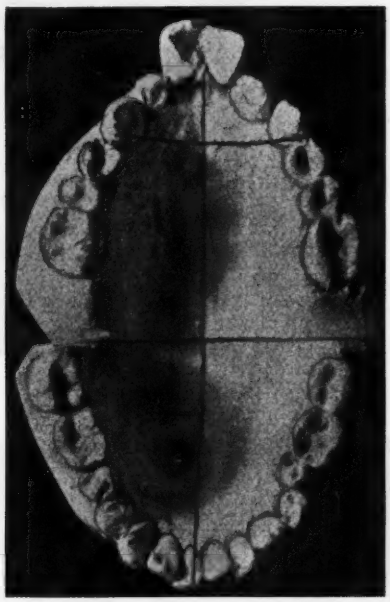

Fig. 14.

measuring-points; we can now measure on the scale the distance of these measuring-points from the median plane, that is to say, the symmetry or asymmetry of the dental arch.

Thus the essential and most important things have been accomplished. We have a model of the teeth which is marked after three important planes of the skull. I am not going to explain now the further work of the technician, in order not to lose any time. It only consists in making the side and back surfaces of the model parallel to one of the three planes.

Figs. 13 and 14 show a finished gnathostat model from the side and opened.

Now what object has such a gnathostat model? It has a double object: the first consists in making measurements on a large number of such models, in order to obtain the normal average. You will understand me best, if I inform you of a very important result of these measurements. We collected

several hundred cases of jaws with correct anatomical occlusion and examined them with the gnathostat. These jaws had all their teeth, and all of them had their right contact and the right occlusion. It was then observed that

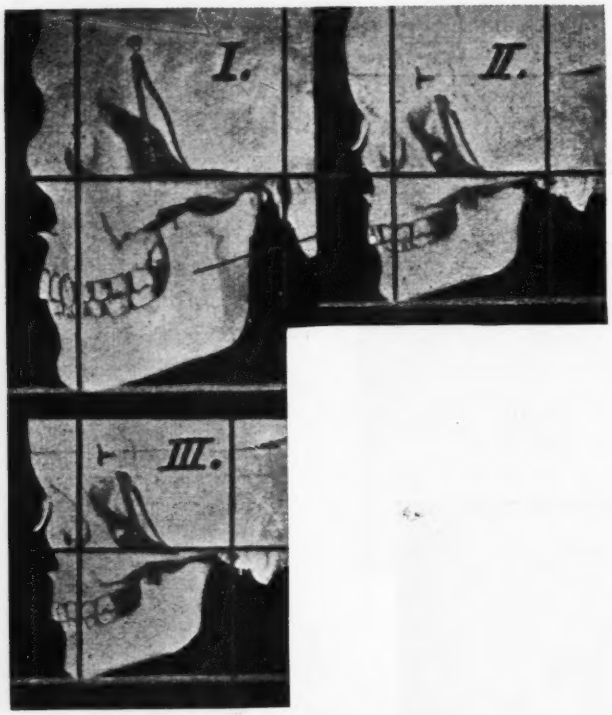

Fig. 15.

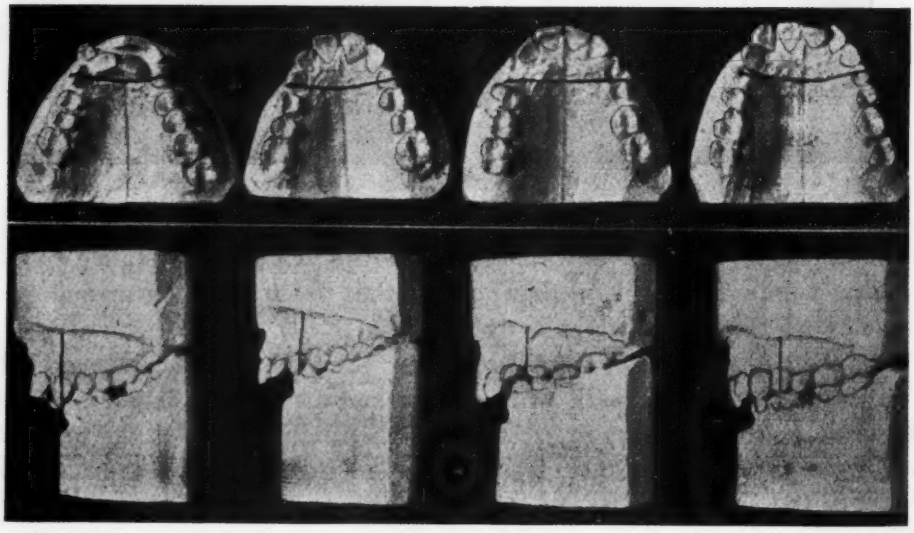

Fig. 16.

in most of these cases the orbital plane passes through the cusps of the maxillary canines. This is an incontestible truth, for which we find various explanations, for instance, from the history of evolution, from physiology, etc. The short space of time at my disposal prevents me from entering into

a more detailed discussion of this subject. I should like to call your attention to Fig. 15. It shows two skulls, one of an individual of eighteen years, the other of five years, placed next to and one above the other in such a way that the ear-eye line and the orbital line fall in one direction. You can now observe that the growth of the face proceeds in a manner which exemplifies the existence of the orbital law of the canines, for though the jaw from five to eighteen years becomes much longer on account of the eruption of the molars, the relation of the front part of the jaw remains the same. This fact is very important for diagnosis, since it justifies the practical rule that the canines are normal when their cusps are in the orbital plane. From

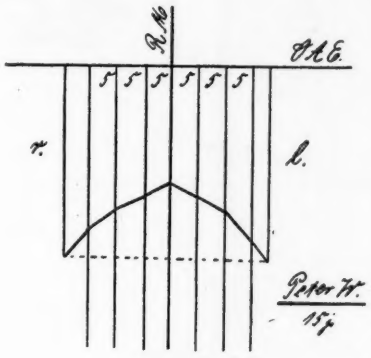

Fig. 17.

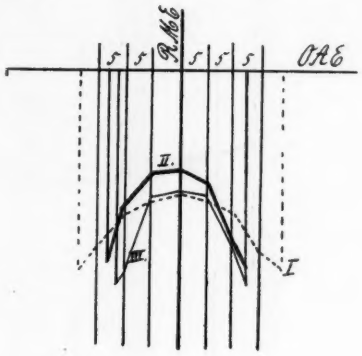

Fig. 18.

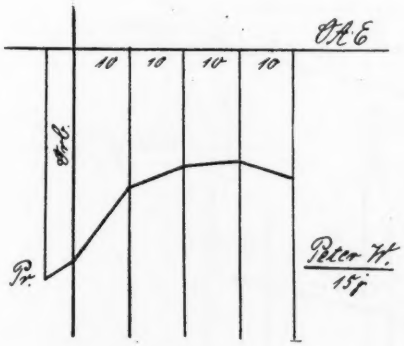

Fig. 19.

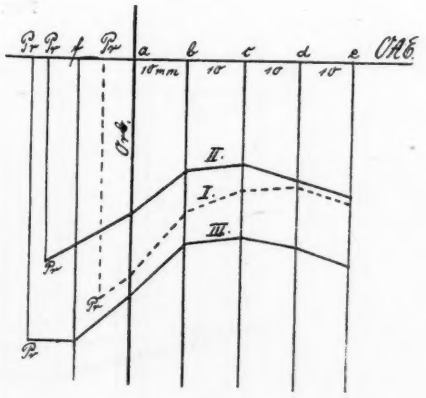

Fig. 20.

this law we infer the diagnostics of the sagittal anomalies, that is to say, of Class II and III. In Fig. 16 you see several models, where the orbital plane passes in the first two cases through the cusps of the maxillary canines, in the third case between | 3 and | 4, and in the fourth case through the cusps of the | 4. In the last two cases, occurring very frequently with a malocclusion, there is a sagittal displacement in the maxilla.

The orbital law of the canines is only one, but it is the most important of a whole series of such rules that I found in the examination of a vast material. As a consequence of these strictly systematical examinations the idea of a normal jaw, on which we base our diagnosis, has been formed. If we compare any case with the normal jaw, we can easily state probable differences and determine the existence and the degree of an anomaly.

In order to make the definition of the difference between normal and abnormal with greater certainty than is possible by a mere examination of the models, I make use of a special expedient, the so-called curve diagrams. You see in Fig. 17 a transversal section through the palate in a plane parallel to the orbital plane and lying two cm. behind it. This curve is marked after the three planes. The upper line corresponds to the ear-eye plane, the

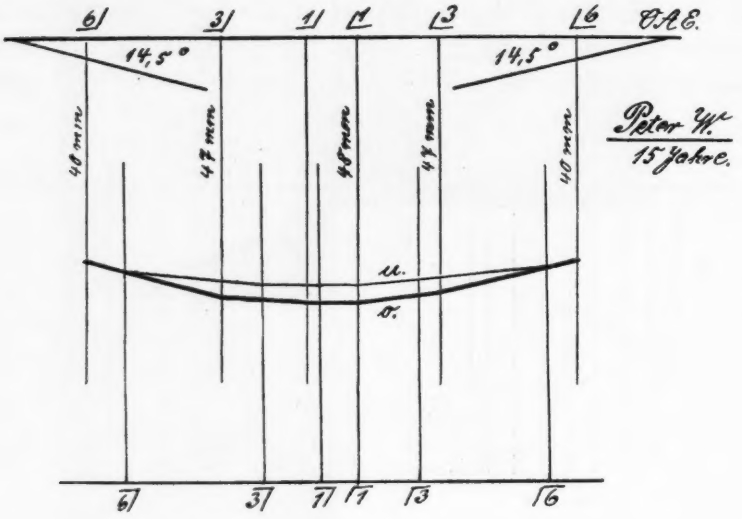

Fig. 21.

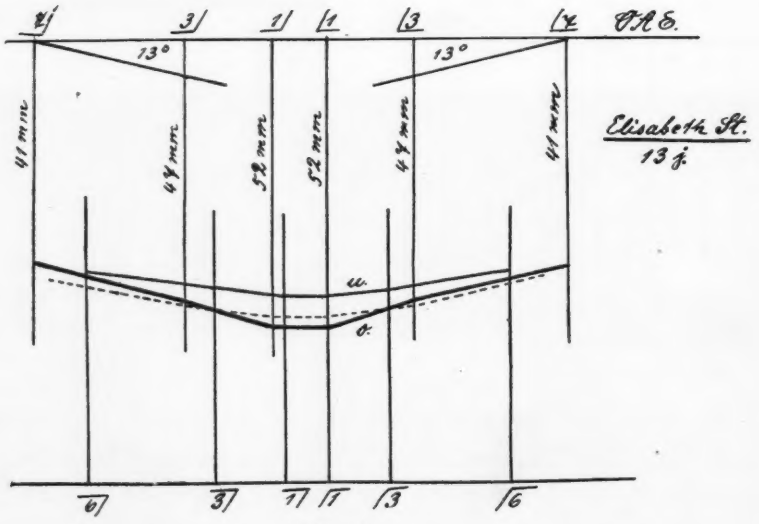

Fig. 22.

perpendicular middle line is the section of the median plane. In Fig. 18 you see some curves of various cases drawn in the same diagram. The dotted curve is a normal curve. You can easily show the differences in the development of the palate. Fig. 19 shows a sagittal section through the palate, again in relation to the planes of the skull. The front final point of the curve is the so-called prosthion, that is the point of the papilla between the middle incisors. This point is situated, according to my measurements, normally

five mm. in front of the orbital plane; but you see in Fig. 20 the great deviations that may occur here. This is of great importance in the treatment of a case. The diagram shows different curves in comparison to the normal curve.

The third kind of curve, very important for diagnosis, is the occlusal curve, which you will see in Fig. 21. You must imagine a line drawn from the left molar over all cusps and edges, around to the right molar tooth,

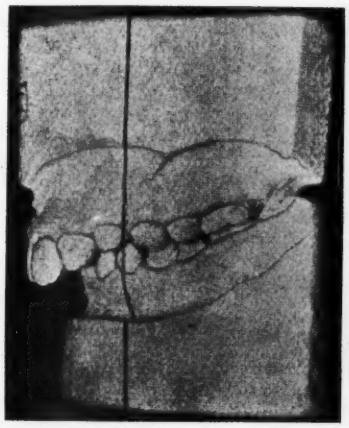

Fig. 23.

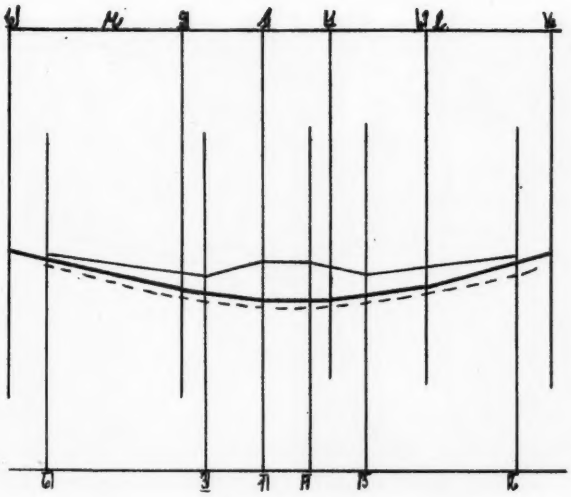

Fig. 24.

and this line then unrolled on a plain perpendicular surface. Above you see the ear-eye plane, corresponding to the upper model base. The lower line corresponds to the lower model base, both are eight cm. distant from each other, as described before. Between them there are the maxillary and mandibular occlusal curves. Some examples will demonstrate the importance of this method. In Fig. 22, a normal maxillary occlusal curve is represented by the dotted line; the thick line is the maxillary curve and the thin line is the mandibular curve of the case to be examined, and you can see what difference there is, especially with the incisors. This method is

very important with such anomalies, the symptoms of which are the deep and the open bite. The diagram illustrates a case of a deep bite, the model of which may be seen in Fig. 23. It is easily recognizable on the diagram, that we will in this case shorten the maxillary incisors, because the mandibular ones are normal. In Fig. 24, however, it is just the opposite; the maxillary incisors are normal, while the mandibular ones are too long, and hence they must be shortened.

I am now going to give a short description of the instrument, with which we make these curves. It is the so-called diameter—(see Fig. 25). The

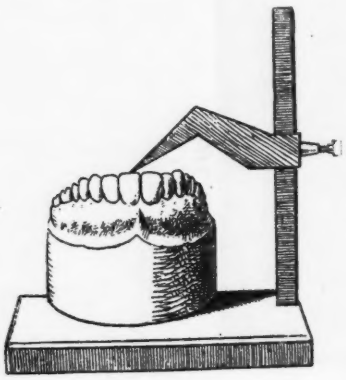

Fig. 25.

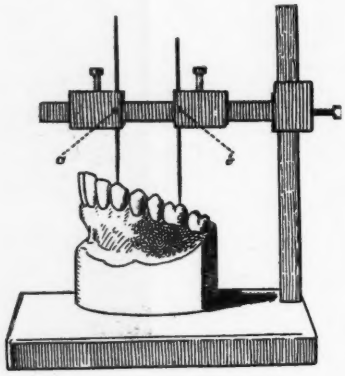

Fig. 26.

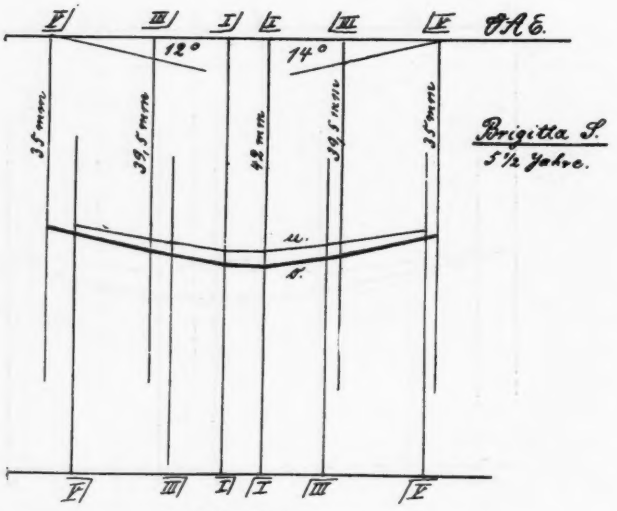

Fig. 27.

model stands on a board; laterally there is a perpendicular rod fixed, and on this rod there is a pointer which can be shifted. Its point and the lower side of its tube are lying in one plane. With this instrument it is possible to determine the exact perpendicular distance of any measure-point on the jaw; for instance, the cusp of the canine or the middle of the edge of the incisors to the ear-eye plane. All we need to measure is the distance of the lower edge of the tube from the base-board and to transfer it on millimeter paper. For this we use a compass. Fig. 26. shows the same diameter, but with another arrangement. You see again the lateral rod and on it there

is another rod that can be shifted and which runs parallel to the base-board, that is, to the ear-eye plane. This second rod has two movable sleeves with perpendicular needles. These needles, adjusted on two measure-points of the model, for example, the cusp of a molar and the cusp of the canine, the distance of these two points can be measured with a compass and transferred on paper. Therefore, it does not treat of the direct distance of the occlusal measure-points, but of the projected distance (a-b). You will now understand the

Fig. 28.

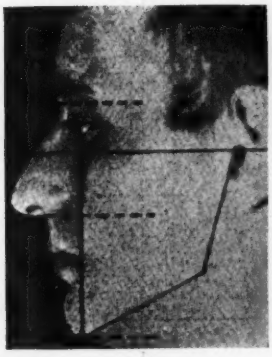

Fig. 29-*A*.

Fig. 29-*B*.

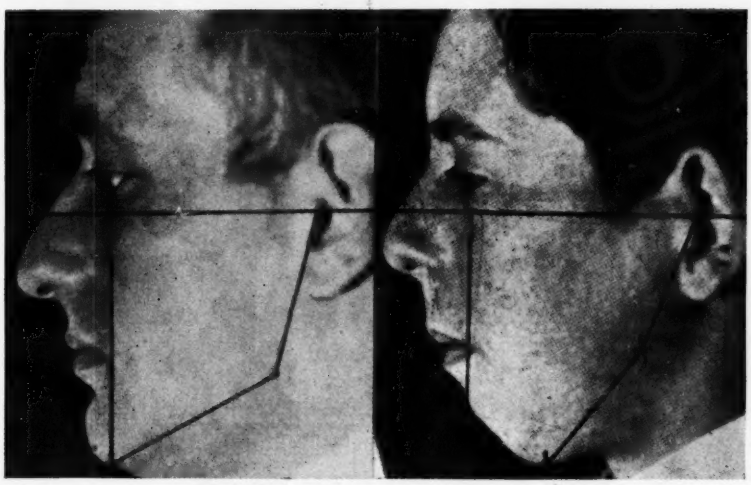

Fig. 30.

formation of a curve diagram; on the upper line the distances of the measure-points are transferred, a perpendicular line is drawn through each point, and on each of these perpendicular lines the distance of each measure-point from the ear-eye plane is transferred. If the foot-points of these perpendicular lines are joined, the desired curve is obtained.

Finally I come to the last diagnostical expedient belonging to my system, the photostatic. You know that orthodontists have always been fond of photographing their patients; but these photos were of no value for the diagnosis, because they had not been taken after exact principles of meas-

urement, but arbitrarily. However, the photostat photo is a metric object; Fig. 28 shows you an example. In the first place the head of this child is taken exactly in one quarter of life-size; furthermore, the median plane of the head is so placed that it is parallel to the photographic plate. Only in this way is it possible to draw exactly the intersection lines of the two other planes, that is the ear-eye and the orbital plane. It is necessary to

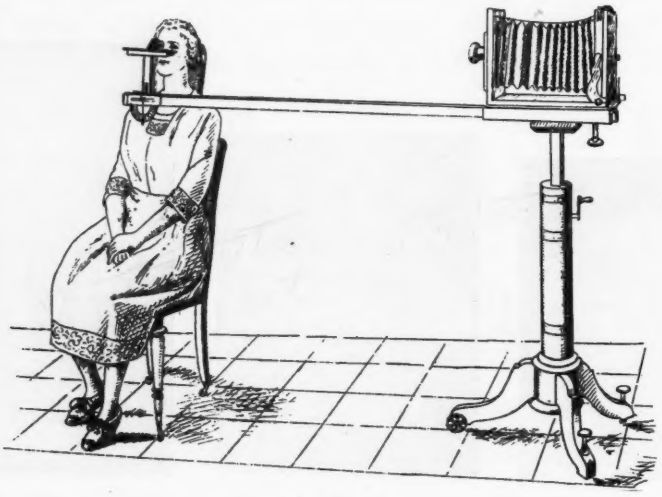

Fig. 31.

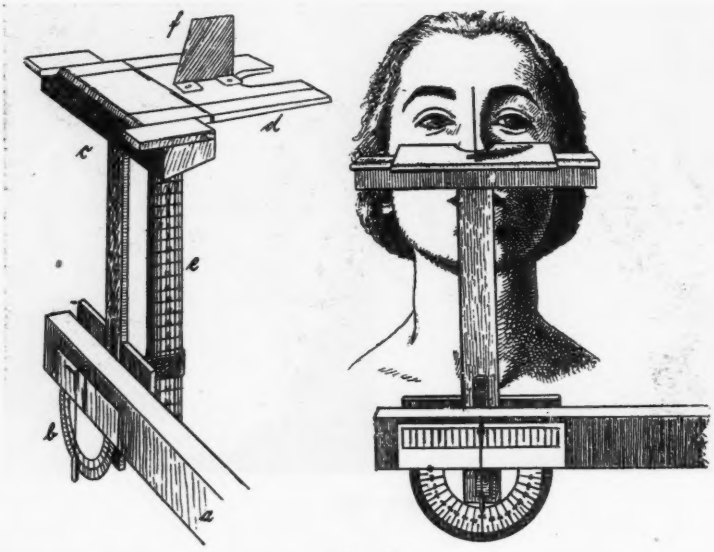

Fig. 32.

join the eye-point and the ear-point by a straight line and draw through the eye-point a perpendicular to this line; besides that, you see two more important lines drawn in. The ear-point is joined to the gonion, that is the point lying farthest behind and below the jaw-angle, and the gonion is joined to the gnathion, that is the point farthest toward the front and below on the chin. These two lines give us a view of the development of the mandibula and the ramus ascendens—indispensable for the diagnosis. With

reference to this, we have also succeeded in discovering various laws of normal development. I will only mention the most important, which corresponds to the orbital law of the canines. I call it the orbital law of the gnathion. It is that normally the orbital line in photostatic projection passes through the gnathion. This law has been found by taking the average of a vast number of measurements.

You see in Fig. 29-*A* such a profile corresponding to the norm. The gnathion is lying exactly upon the orbital line. There are some other qualities belonging to the norm I merely mention on this occasion without entering too deeply into the subject; the point of the corner of the mouth (cheilion) lies also upon the orbital line, and the oral fissure is situated more or less rec-

Fig. 33.

tangular to it. Furthermore, you can find here an important proportion. If we draw lines through nasion that is the root of the nose and the lower limit of the nose and gnathion, parallel to the ear-eye plane, so the distance of these lines from each other is about the same.

In Fig. 29-*B*, you see the teeth belonging to the profile illustrated in Fig. 29-*A*, and you can convince yourself that they possess an anatomic correct occlusion and form of the dental-arches.

Fig. 30 on the other hand shows once more the same normal profile and for comparison a very abnormal face with very strong dental anomalies. One can see how distinctly these anomalies are reflected also in the face, and how they can be recognized and measured on the picture.

Before giving you some examples, I am going to describe to you the photostatic method.

Fig. 31 demonstrates the photostatic apparatus attached to a solid stand. Laterally there is a beam of a certain length fixed, and at the end of this beam there is the nose-board. You will understand its arrangement better in Fig. 32 on which the position of the head is shown. The patient is sitting on an ordinary chair, which is provided with a head support and rollers on the legs, so that it can be moved toward the apparatus. The nose of the patient comes into the cut of the nose-board in such a way that the edges of the board are touching the orbital points. The thin perpendicular plate is the nasion-aimer. The orthodontist is aiming along this plate toward the middle of the patient's dorsum nasi. Now the exact posing is finished; the median plane of the patient is parallel to the negative plate and is always the same distance in each photo. This distance is controlled with the help of the median ruler, the millimeter scale of which is distinctly visible in the ground glass of the camera. It is best to take the photo with artificial light, so that there are always the same conditions prevalent. The whole pro-

A. *Measurement from the median plane.*

1. *Contraction:* The part of the jaw is too near to the median plane.
2. *Distraction:* It is farther away than normal.

B. *Measurement from the orbital plane.*

3. *Protraction:* The part of the jaw is standing more forward than normal.
4. *Retraction:* It is farther back than normal.

C. *Measurement from the ear-eye plane.*

5. *Attraction:* The part of the jaw is too near to the ear-eye plane, that is to say, it is standing higher in the head than normal.
6. *Abstraction:* It is too distant from the ear-eye plane, that is to say, it stands deeper in the head than normal.

Fig. 34.

cedure, that is to say, the pose of the head and the photo does not take more than about three minutes.

At last I am going to give a small selection of diagnostic examples. I hope that my lecture will thus be more intelligible and above all, that you will distinctly see the progress compared with methods heretofore used. But I must first explain my new division of the anomalies, otherwise it will be impossible for you to understand the explanation of the following examples.

Each model is measured from three planes, and the measurements are compared with the normal measurements. Proceeding thus, there will be either a *conformity* of some measures, and in that case there is no anomaly on the respective spot, or there is a *difference* noted, and then we say, there is an anomaly. This difference is either a plus or a minus. We, therefore, come to the scheme shown in Fig. 34.

But the diagnosis of a case is not finished by determining only the plus or minus in relation to these normal measures; we need an exact localization of the anomaly. It is, for instance, possible that the orbital plane may pass through the cusps of the canines, which would mean that these measure-points are standing correctly. Nevertheless it is not yet proved that the

roots of the canines are also standing correctly. It may be possible that they are too far *forward* or too far *backward.* This little example, one among a great many, proves the necessity of distinguishing the exact position of the different parts of the jaws in relation to the normal state. The most important parts are the *dental,* the *alveolar,* the *maxillary* and *mandibular,* See Fig. 35-*A, B, C, D.* Fig. 35-*A* is a sketch of a normal mandible. We recognize it, because first, the gnathion is situated in the orbital plane; second, because the orbital line goes through the distal edge of the canine (in the maxilla it goes through the cusp of the canine); and third, because the axis of the crowns are parallel to the orbital plane, that is to say, perpendicular to the ear-eye plane. In Fig. 35-*B* you find that the orbital plane is situated in front of the distal edge of the mandibular canine, or in other words, the canine stands too far back, and with it also the premolars and

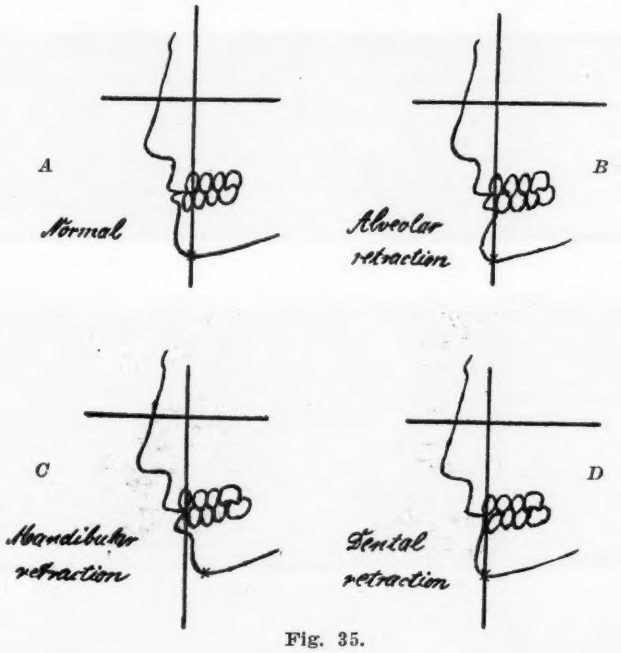

Fig. 35.

the molars, as they have the anatomic contact with each other; we, therefore, state a *retraction.* But this diagnosis is imperfect, for you see that the gnathion lies in the orbital plane. Therefore it is normal and consequently, the body of the mandible is also normal, and the retraction concerns the alveolar part of the mandible. We call this case a *lower alveolar retraction.* In Fig. 35-*C* you see the same state of the teeth as before, but the gnathion is situated behind the orbital line; we call that a *mandibular retraction.* Fig. 35-*D* shows a fourth form in which the teeth are again too far behind the orbital line, but they are inclined towards the back, and the gnathion is normal. We may, therefore, suppose that the mandibular and the alveolar parts are normally developed and that retraction concerns only the tooth crowns which we call a *dental retraction.* But with all that, all the possibilities are not exhausted. It goes without saying that you will find the same variations in the protraction and the other four anomalies (contrac-

tion, distraction, attraction, abstraction), and in the maxilla as well as in the mandible. It is not difficult at all, with the help of the gnathostat model and the photostat photo to find out, and get a clear view of all these variations. Such a distinction is of the greatest importance for orthodontic therapy; taking once more the same example of the mandibular retraction you will easily understand that a dental retraction must of course be treated differently from an alveolar, and the latter differently from a mandibular. In the last case the whole mandible must by all means be brought to frontal; in the second case of *alveolar* retraction the teeth must be brought forward in the alveolar processes by bodily movement, and in the first case their crowns only must be inclined forward.

In conclusion I should like to show three other cases in order to put the new methods, compared with the diagnosis hitherto used, in their proper light.

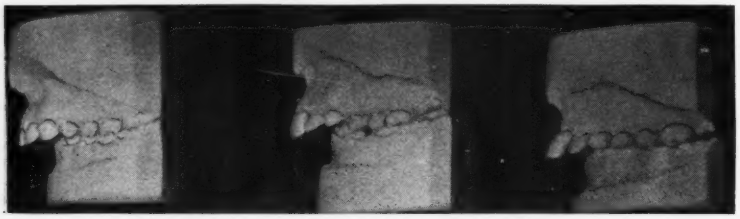

Fig. 36.

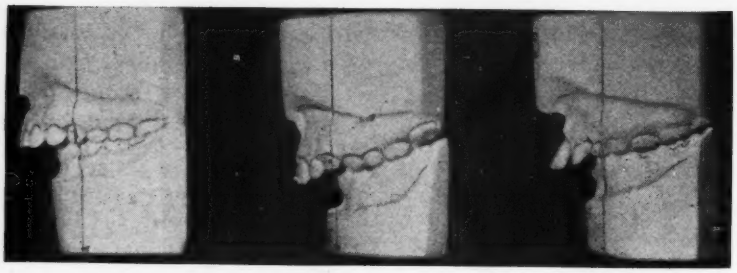

Fig. 37.

The three models you see in Fig. 36 have been made according to the old system. The three cases are seen to be very similar. There is in each case a Class II, underdivision I (mouth-respiration); there is also a deep bite to be recongnized of an intensity approximately the same height.

On the basis of this diagnosis in each of these three cases a rather similar treatment should be used. The dental arches should therefore be stretched, the protruding maxillary front teeth be moved back and the mandibular teeth should be brought frontally as far as their normal occlusion. The diagnosis does not reveal to us, whether the whole mandible is to be brought forward, or only the teeth in the jaw; nor do we learn anything as to the treatment of the deep bite, so that it depends upon technical consideration or upon mere accident, whether the maxillary or the mandibular incisors, or both are to be shortened.

In Fig. 37 are seen the same three cases, but arranged gnathostatically and photostatically. You see first the three gnathostat models. Here we

are, above all, interested in the course of the orbital plane. On the first model it passes through the cusps of the first premolars, the second and third models through the cusps of the canines. We know what this result of the examination means. In Case 1 there is an *upper total alveolar protraction,* that is to say, all the teeth, the molars included, are by a whole tooth too far frontal. In Cases 2 and 3, however, there is only an upper *incisal* protraction, because the lateral teeth are standing normal. And here is also a difference, as you will see in Fig. 38, a picture from the sagittal palate curve. In the second case you see the prosthion greatly protuberant, about 15 mm. in front of the normal prosthion. In Case 3, however, the prosthion is almost normal. From this it follows that the incisal pro-

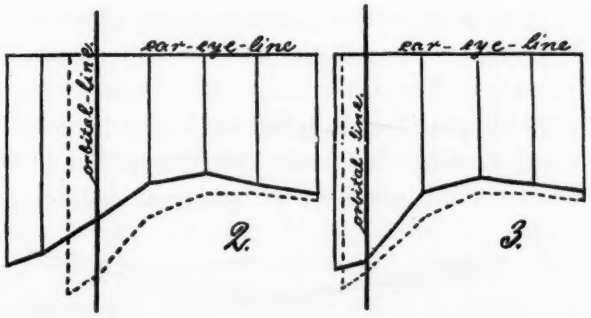

Fig. 38.

Fig. 39.

traction of the second case is in its principal part *alveolar,* and in Case 3, only *dental.* Consequently the following treatment of the three maxillary jaws, at least in sagittal relation, must be made. (The measure A. starting from the median plane, that is to say, the contraction or distraction, I must pass by for lack of time). In the first place you can move either all the teeth occipitally, of course, in bodily movement, which I only do with very young children, when the second molars are not yet there, *or* the maxillary first premolars may be extracted. Consequently, the back protraction is left untreated and only the front protraction is removed. I always follow this method if the patient is about twelve years old and more. In the second and third cases no extraction must be made, of course; extraction would be

a great blunder but in these cases the *incisors* must be moved back, though in a different manner. In Case 2 also the alveolar process must be moved together with incisors and with the help of a good bodily movement; while in the third case only a rotation of the incisors around their transversal axis will be necessary.

Now let us go to the mandible. We remember, that we have proved in all three cases distal bite (Angle Class II). In the first case there was in reality, an upper medial bite, that is to say, the lower dental arch is quite normal, and, if I ask you now to look at the photostat picture of this case in Fig. 39, you will find a normal position, since the gnathion is situated on the orbital line. It is different in Cases 2 and 3. Here the maxillary molars are standing normal, consequently the diagnosis "distal-bite" is correct.

Nevertheless it is only imperfect, for we do not know as yet the principal thing: whether it really treats of an *alveolar* or a *mandibular* retraction. This can be found out without any difficulty whatever from the photostat pictures. In Case 2 the gnathion is lying correctly there is consequently an *alveolar* retraction, which can also easily be ascertained in the sunken lower lip. In Case 3, however, the gnathion is lying far behind the orbital plane,

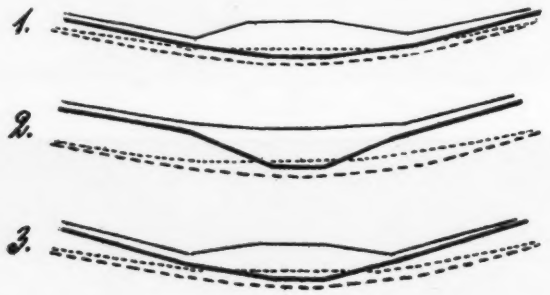

Fig. 40.

there is, consequently, quite distinctly a *mandibular* retraction. Very instructive is also a comparison of the lines marking the jaw body, the ramus ascendens and between them the jaw angle. In Cases 1 and 2 you see a large conformity of all measures; in Case 3, however, the jaw angle is larger, and the lines are shorter, which leads us to believe that there is a defective development. The treatment of the mandibular jaw in sagittal relation is now perfectly clear. In Case 1 the lower jaw must not be altered at all, in Case 2 all the teeth must be moved, one after the other in the jaw frontally; consequently the transition of occlusion has to be made, and in Case 3 the whole lower jaw must be brought forward in its totality. Of course I cannot dwell upon the treatment methods.

Finally I must call your attention to the measurement C, from the ear-eye plane (Fig. 40). We proved in all three cases more or less the same deep bite. If, however, you look now at the three occlusal curves, you will see further important differences. In Case 1 the maxillary curve runs parallel with the maxillary normal curve, the mandibular curve, however, is bent upwards in the middle. We call that a *mandibular incisal attraction.* In Case 2 the mandibular curve is parallel with the mandibular normal curve, while the

maxillary curve is very much lower. Here is, therefore, a *maxillary incisal abstraction,* and in Case 3 neither the maxillary nor the mandibular curves are normal, we rather state a maxillary incisal abstraction plus mandibular incisal attraction. The treatment is accordingly different. In Case 1, only the mandibular incisors; in Case 2, the maxillary; in Case 3, maxillary and mandibular incisors are to be shortened. Also the degree of this movement is distinctly to be seen from the curves, so that the force of the orthodontic appliance can be arranged accordingly.

These are the most important diagnostic relations in the three cases. I hope you will admit that it is impossible to find out by means of the usual models, or by merely looking at the patient, all these distinctions so exceedingly important for the treatment.

In conclusion of my explanations I must come back once more to the beginning. I have said that the dogma of the molar constancy represents a *fiction,* and that I would place in its stead another and better fiction. I must briefly call your attention to this point, because it contains the essential theory of my system. You have seen that I judge and measure the anomalies of the jaws by comparing them with a determined normal law. This normal jaw is not, however, a natural jaw. It is not by any means a specially fine and regular jaw of any individual; but this normal jaw that we put as its basis, as an example, as an ideal, does not exist in reality; it is a fiction, calculated as an average from a possible large series of individual cases. I have already tired you too much with my long explanations, so that I cannot say anything more about it, although in philosophic, anthropologic and orthodontic respects it is really very interesting. I beg to say that a minute elaboration of this theme under the title of "Der Normbegriff in der Orthodontie" will shortly appear.

Mr. President, ladies and gentlemen, I am through with my paper. I am afraid the long duration of it has exhausted you. Yet it was hardly possible to make it shorter, as the material is too large. I was anxious to give you a possibly clear picture of the gnathostatic diagnosis, constantly applied for the last few years in practice by myself and by many of my students, which is proving so satisfactory to us. I hope that you may have understood my words tolerably well and thank you most heartily for your kind attention.

DISCUSSION

Dr. Dewey.—I do not know that I have listened to a paper which contained so many things with which I agree as this one does. There are so many points which Simon has presented that I hardly know where to begin to press them home to you or to state such slight differences as may arise between the paper and my own views. Such differences are probably a result of misunderstanding rather than a difference of opinion.

In the beginning of the paper he called attention to the error into which orthodontists have fallen by trying to base classifications or arch relations upon the position of the first maxillary molar. If you have followed some of the later writings you will find a great many men in this country have long ago discarded the theory that the first maxillary molar was immovable, and have also for a number of years discarded the anterior posterior relation of molars as a basis for arch classification. Today we try to say that classification of arch relation is based upon the position which the mandibular arch bears to the maxillary

arch as related to the face and cranium and not upon the relation which the mandibular arch bears to the first maxillary molar. So I thoroughly agree, that we have to discard the old theory of the maxillary molar and consider the dental apparatus as a whole in relation to the face and cranium. From that point it is simply a question of which plan you are going to use to establish or show the relation which the dental arches or teeth bear to the face and cranium as well as to each other.

In listening to Lischer's paper this morning and seeing the manner in which he measured his photographs, then in looking at the models our essayist showed this afternoon, I could not help but think that a certain member, or rather two members of this Society have done a piece of work which has been published but never reported before this Society, and that solves this problem of a study of arch relations to the face and cranium much better than anything Lischer or the essayist this afternoon have presented. I refer to none other than our friends Eby and Oliver.

Federspiel made a statement this morning which I think a great many of you failed to grasp; it was, that facial casts presented evidence that could be obtained in no other manner.

A few years ago, (I do not remember the exact time, maybe Eby remembers) Eby worked out a technic whereby a facial cast was secured with the teeth in full occlusion, occupying absolutely the position that the teeth occupied in relation to the face and cranium. When you have that form of a record, you have a record which is superior to the photograph, superior to the cast alone, or superior to anything that has ever been presented before or since. You have a positive record that you can go back and check up on. You can take any point you want to select and you can make your measurements from your cast to any tooth, any part of the face, any particular point on the face, today tomorrow or ten years from now. It shows conditions that you cannot get any other way.

Now I, therefore, believe that Eby's method which he worked out, later perfected by Oliver, is superior to either the method proposed by Lischer or the essayist this afternoon.

Another thing to which I want to call your attention and with which I am thoroughly in accord is the necessity of selecting three planes from which to study malocclusions of teeth. However, the difficulty in times past has been to decide from where those planes should be selected. If you will remember, the statement which is in print that positions of malocclusion or malpositions of teeth must be reckoned from the plane of occlusion, the median line of the face and the line of occlusion, to which the essayist has called your attention today. Furthermore, I want to again call your attention to the fact that several years ago, as far back as 1915, Stanton made the statement that positions of malocclusion must be studied in three planes. He has presented his theory to the members of this Society at various times, and I am sorry to say his idea has not been universally accepted.

The last illustration which Lischer showed us this morning of the drawings of the three planes, which he labeled A, B and C, reminded me of a similar illustration which I saw in Stanton's office in 1915, but in which the three planes were called X, Y and Z. Now you may wonder why he chose the last three letters instead of the first three letters of the alphabet. The reason X, Y and Z were chosen by Stanton was because they were suggested by Fish, an engineer from Columbia University. Engineers for ages have located all objects upon three planes; universally, engineers use the same terms, and those three planes are known as X, Y and Z. Therefore, if we are going to adopt the three planes let us keep our nomenclature in conformity with other scientific bodies and not inject A, B and C which to the engineer would mean nothing but let us use the terms X, Y and Z.

I have probably fought more with Stanton over his terminology than anybody else because, as you know, he has peculiarities, and I have been accused of the same thing but upon the principle of the three planes we have agreed; upon the terminology we have not agreed.

Our essayist this afternoon presented another terminology for malpositions based again upon the three planes. Now, I have practically decided, in fact I already have in the new edition of my book dropped the old terminology of malpositions of teeth and am writing it on the question of the three planes, but it is going to be hard to put it over, and I thank the

doctor for coming today and presenting his arguments in favor of that plan of classifying malposition.

According to our present terminology of malpositions of teeth, we have some things which are extremely contradictory. If you will let this line represent a dental arch, and this line through here represent the Y plane, and the line across here the X plane, that will be your X plane and this will be your Y plane. You start around here now and you have malpositions of teeth; say this is a normal tooth, the normal position of a tooth on a line of occlusion or on a plane of occlusion. You have but two directions represented on the flat surface, of course. If this tooth is moved in this direction, it will be called an X-plus and it will be X-plus one millimeter or two millimeters, depending on how far you move it; if it is moved in this direction, it will be X-minus. It is the same way if a tooth is moved in this direction, that will be a Y-plus and the opposite direction or posterior will be Y-minus. Those terms are understood by engineers the world over. If the tooth is vertically on a plane known as a Z plane, that tooth will therefore occupy the position of Z-plus or Z-minus.

Ordinarily we speak of teeth as occupying positions of mesioclusion or mesioversion. A tooth in mesioversion is a tooth too near the median line. We start with the molar; if it is in mesioversion or too far toward the median line, in this direction, we move it in the direction of a Y-plus. If you take an incisor over here and move it towards the median line, we still speak of this incisor as occupying a position of mesioversion, but on the plane theory this incisor would be an X-minus. Still we have used the same terminology to describe two different malpositions of teeth. Therefore, I am in hearty accord that the three planes theory be adopted in the study of malpositions of teeth.

The only difficulty which exists will be to take a standard base from which to start, but that can be selected anywhere, at any point, because positions are always relative. For vertical, or Z-plane, the engineer has chosen sea level; for East and West, a certain meridian, has been chosen; for North and South, the equator is the standard base. Everything can be located in the world or in the sky or any place on those three planes, can be determined by engineers and astronomers.

Unfortunately, there has crept into the dental literature (and I am sorry to say the essayist expressed it, although it was probably because of his unfamiliarity with the English language rather than a misinterpretation or misunderstanding of a scientific proposition) the idea that American orthodontists have a misconception as to what is meant by Class II condition. Lischer has argued that with you for years, and still we find members of this Society, as our President said, continually using the term Class II.

Now, what is meant by Class II, or a distoclusion, is a posterior relation of the mandibular arch as related to the face and cranium, and a Class II condition is not a case where you have an anterior position of the maxillary arch with the mandibular arch normally related to the face and cranium. Lischer has given the proper terminology for that kind of a malocclusion.

The question of the essayist's methods is one thing with which we might disagree; although he has made a great advance he is farther ahead than almost any one else in his plan of determining these planes. Those of us who have had an opportunity, or rather have been more or less close to modern prosthesis, have realized for years the impossibility of locating definitely and positively such a common anatomic point as the head of the condyle. Prosthetists in attempting to locate that point very often make mistakes. You are going to have the same difficulty in attempting to locate this point under the eye. You may have it a little too high or a little too low, a little too far to one side, which to my mind is one of the greatest weaknesses of the method. A failure to locate that point properly will result in an error in the establishment of the planes. Therefore, that very error which I mentioned can be eliminated by the facial cast and the dental insert as Eby and Oliver worked them out several years ago.

Another point which seems to me to be important (and the essayist admits that some of his points are fictional just as the position of the first maxillary molar) is, as I understood the paper, that he did not take into consideration facial and facial types to the extent which they will play a part, in his plan of diagnosis. It is a demonstrated fact that

the position of the mental foramen on mandibles does not occupy the same relation with premolars in the different races. Equally well can it be demonstrated that the infraorbital foramina do not occupy the same position in all skulls. It must also be recognized that the maxillary bone is not going to be the same size and shape in a negroid race, or a person that has a prehensile type, as it is going to be in a straight faced individual. You must also remember that Dr. Lischer this morning showed you by his photographs and measurements of the face the distances from this chin to the ear, and from the forehead to the ear, and from the ear to the nose, varied in different cases and in different types of development.

As I understood our essayist this afternoon, he is taking this orbital plane here as a standard and the orbital plane will vary as the superior maxillary bone varies in development and we know the superior maxillary bone varies in development just as much as any bone of the face, and that is especially true in acromegalic conditions. So, therefore, I really do not see but what you are going to make just as much of an error if you try to establish arch relations, normal arch relations, by taking the orbital plane as normal in all cases as you would where you try to base your classification upon the first molar. You can not take any one point on the face and cranium as a standard because it will vary in races, vary in different types of development and vary as compared to abnormal developments that exist as compared to the maxillary and mandible.

I mentioned a few minutes ago the need for definite nomenclature, for individuals to say what they mean. Our essayist used the term "mandibular retraction." Now, "mandibular retraction" could mean several things, that is you could give it several different meanings. By "mandibular retraction" you might mean a posterior position of the mandible in which the condyle has assumed a posterior relation or you might mean an under-development of the body of the mandible. From the essayist's paper I was unable to understand which condition he was talking about.

Our friends Lischer and Federspiel have handled those things very nicely and they have given us a nomenclature regarding positions and forms of the mandible which is very good, but which, I regret to say, has not been accepted by members of this Society.

In closing I want to say I enjoyed the paper very much, and especially I was interested in the maps which the essayist used showing the different curves of occlusion and the different planes as taken from the models. Again you must remember that Stanton called your attention to that several years ago. The majority of you laughed at him. Simon has presented the same thing. I agree with him, as I do with Stanton, that occlusal maps can be made which will give information that you cannot get as positively any other way.

The question of instruments for making those surveys: I believe Fish has worked out instruments which are more accurate than the ones which Simon showed, but the instruments manufactured or created or designed by both men have the same purpose, the same plan, and both men are working along the right line. I only hope that Simon's paper will be a means of putting over the importance of the three planes, the occlusal maps and a great many things which some of us have known in this country for a number of years but which we have failed to adopt.

I want to thank the doctor for coming over here and presenting this paper because it has been a long time since I have heard a paper that I was able to agree with to such a great extent. I thank you.

Dr. Lischer.—Two years ago Simon published a book on the subject of orthodontic diagnosis. After I procured a copy of the work and started reading it I could not resist writing to him and expressing my appreciation. I had planned a review of his work as a part of my paper of this morning, in case he could not be here. I am very thankful that he was able to come, so that we get his message first-hand.

In beginning his discussion, Dewey said that it was not important which points we selected as a basis for measurements, because all measurements were relative. This is correct; but in closing he found fault with the orbital plane. We may find that this orbital plane does not pass through the cusps of the canines in a majority of Americans because a racial variation may exist here; but it is also true that this is the only available

method by which we can find out. Further, it is also the only method whereby we can show the relation of the denture to the jaws and face. Our friends, the engineers, have never been able to demonstrate that.

In showing a diagram of the three planes this morning I had no intention of stealing anybody's "thunder." I have no "axes to grind." What I am trying to find is a practical, scientific solution of our problems. As I said in my paper, we must find some way of orientating the denture to the head.

Some of you may remember the debate on nomenclature we had at our meeting in Toronto. I said then, and I repeat it now, that whenever we get any better terms than I proposed, I will help to bury mine six feet below the sod. After carefully studying Simon's work I am on the verge of discarding all previous methods and terminologies, including my own.

I am very much pleased with Simon's methods of diagnosis and I deem it a privilege and an honor to have listened to his very scholarly essay this afternoon. He is prepared to give a clinical demonstration before adjournment and I am convinced you will not then regard his methods difficult, or hard to apply.

I want to thank you, personally, Dr. Simon, for your very able presentation of the subject.

Dr. Hawley.—I have not given this matter any study neither have I seen Simon's book, but I have been very much interested in his lecture. I have been unable to follow definitely all the procedure, and I presume that I will not be able to understand it fully until this work is in print and until I see his demonstration. But I do appreciate the great value of the work he has been doing and I think it starts us on a line of study that is going to be a tremendous advantage to orthodontia.

We ought to congratulate ourselves that we have been able to get Simon over here, that he made this long journey and spent the time with us that he has, and we are also delighted to get acquainted with him personally. I think when we can get the publication of his paper—and we do not all read German so perhaps we can get a translation of his book—his reputation will be very much increased and our pleasure and our instruction will be very greatly augmented.

Dr. Suggett.—I was fortunate enough to be invited by Lischer to come to his home and office and see this work demonstrated there last week. The theoretical part was hard for me to grasp because, while he was kind enough to give me his book printed in German, it did not mean very much to me; however, the pictures conveyed a great deal. The demonstration was something that I could follow out and I found it exceedingly simple. It seems to be one of the biggest steps forward that we have made to find the third plane by which we can determine the relationship of the arches to the rest of the skull. It is such an easy method and so simple that no one will have any trouble in using it, and then in making a diagnosis of a case with the aid of the models, diagrams and pictures. You thus have a diagnosis of the case that tells something; a diagnosis that you can present in terms that will be understood by other people. I feel it is a wonderful step forward.

Simon's terminology seems to me very satisfactory and simple. A great many of those terms have been used by anthropologists for years. It seems to me scientific men will understand them, and it will be easier for us to express ourselves in terms that others will understand.

I have enjoyed the paper very much, and I appreciate the work that Simon has done to achieve this. It has taken some eight or ten years to do. When I heard his story of his regular daily regimen it seemed marvelous to me. I wish I could do that; have almost every minute of the day taken up, and far into the night, studying until one o'clock on this work for years and years. It is a wonderful thing to do and he has accomplished something worth while. I think it is a forward step that is of tremendous importance to all of us.

Dr. Eby.—I do not feel that I am in a position to criticize or commend Simon's work further than a few comments on the subject.

The past few years have evolved considerable progress in the application of mathematical problems in an effort to predetermine the exact extent of malocclusion. It is generally conceded that the recognition of anteroposterior, lateral and vertical displacements of the maxillary arch in relation to the head would be the most valuable service which engineering methods could perform, certainly more valuable than the predetermination of individual arch form.

It must be admitted that after the adoption of or acknowledgment of the degree of accuracy or inaccuracy of the landmarks which Simon employs, that his mathematical formulae and the very fine mechanical apparatus which he has perfected is quite faultless and is not prohibitive in its application.

Knowledge is gained through the process of elimination of theories or their conversion into facts. It is my opinion that continued study on this subject is imperative, and one which the science of orthodontia cannot fully disclaim or acclaim at this time.

I feel that all the members of this Society should welcome the fact that through this organization we have been able to have Simon introduce his work and it is in this spirit that I trust the further exploitation of his method by our members will reveal additional facts of merit which will contribute to the final solution of this phase of Orthodontic science.

Simon deserves our commendation for the necessary knowledge, skill and labor which he has combined in the production of this work.

Dr. Ferris.—I would like to state that for several years I have controlled my orthodontic practice by a survey study of the three planes plotted, so am familiar with the essayist's subject in general.

I would like to ask the Professor about the hypothetical position upon which he bases his work. In listening to his paper I gained the impression that he starts his measurement upon the assumption that the "ear-eye plane," a line drawn between the external auditory meatus and the orbital point, are stationary in the cranium.

It is generally recognized by the anthropologists that there is no point fixed in the human head other than the anterior border of the foramen magnum on the medial line. If the auditory meatus externus does not travel anteriorly in the growth of the head, then the basis of measurement that has been taken here would be a stable point upon which the perpendicular line could establish the relation of the two arches; but the movement of that line and bone material one millimeter anteriorly, would change all the relations that he presents and defeats the basis of his diagnosis. If, on the contrary, it can be proved that the anterior movement of the bone in the region of this line is proportional to the anterior growth of the alveolus and dental arch, Simon's hypothesis would seem to be correct, but this diagnosis if accepted would put all faces in the same type on their perpendicular axis, simulating the Apollo type, which we know would not develop harmoniously in balance with other proportions of the head and face. You can imagine an Apollo chin on the profile of Savonarola and you will see the incongruity of such results. I would like to have the Professor elucidate these points if he will.

Dr. Waugh.—There is one point I feel should be brought out. Simon's presentation is the first successful effort that has been made by which it is possible for us in a practical way to establish the relationship of the arches, the teeth and the jaws to the cranium as a whole, and in that it stands out as a most important step in advance.

Dr. Delabarre.—Taking into consideration the present trend of orthodontia, as I feel the pulse of our specialty, which is toward early treatment of cases, it would seem to me that Simon needs more data behind him, as we all need it in order to treat these cases in the early years of life; that is we must have, first and foremost, measurements and statistics, maps, curves and averages—everything that science can give us that will tell us the history of the development of the individual from the earliest age up to maturity. As you all know, Angle developed his orthodontia, applying it to twelve years of age or over without attempting any definition of this normal course of development. But we have gone beyond that point, and through Bogue's teaching and others, we are now attempting to correct our cases earlier.

It is not shown by the lecture this afternoon whether the relationship of the orbital plane to the deciduous canines is the same as it is to the permanent canines; that we must know before we can adopt his method and apply it to the treatment of these early cases.

I have been trying for years, since 1909 or 1910, to make the diagnosis of my cases on the basis of the three planes of the skull. I have approached it in a very different and a very crude way, but in an honest way and I have always tried in every case to take into consideration all three possible movements of the teeth in my attempt to correct them. This, however, is a scientific method and I look for its further development in its application to our work.

I want to thank Simon personally for coming to us and giving such a scientific, and laboriously worked-out demonstration of this topic.

Dr. Miloslavich.—This is a field new to me. I am not an orthodontist and therefore I cannot discuss the practical importance of these methods, but I see their value from the viewpoint of a morphologist. It is an entirely new method involving new procedures which Simon has demonstrated, and it will enable us to perform more accurate studies in craniology and encephalometry.

If someone were to study with Simon's methods the development of the jaws in relation to the skull as an entirety from early childhood until after puberty, I think we would have some wonderful data for understanding the facial abnormalities, particularly deformities which may develop during the stage of dentition. I hope that in the near future someone will undertake the task to study systematically this troublesome and difficult problem.

Dr. Federspiel.—I want to extend to Dr. Simon my appreciation of his wonderful paper that he presented to us this afternoon. Unquestionably it required a tremendous amount of work and years of study to prepare a paper of this kind. But as I get older I am somewhat getting away from treating diseases and deformities of the mouth and jaws and face with a two-foot rule. I cannot help it. Probably it is due to my ignorance, but after all so many deformities are caused by diseased conditions and they may carry with them landmarks which we would like to utilize in our measurements.

Let me call your attention, for instance, to the maxilla which at birth we find with no antrum. We find the tooth buds resting against the orbital plate. The growth of the teeth depends entirely upon so many factors that if any one of those factors is robbed of its natural tendency to growth, for instance such as failure of development of calcium, we get a formation there where the osteoblasts do not seem to be developed into activity. That brings me to the subject of function. Function determines structure. I believe that when we see cases where the mandible is ankylosed we lose a good many landmarks because that mandible fails to develop intersticially as it has been robbed of its function. This is also true of the maxilla. I believe that this bone is more susceptible to arrested development and malocclusion and changes than the mandible because of its relation to the turbinates, to the nasal chamber, to the antrum, to the muscles of mastication. All of these factors, will have a tendency to change or arrest or overdevelop the maxilla. Therefore, I could never conceive of the statement that was made years ago that the first molar always erupted in its normal position. I believe I was one of the first radicals, so-called wilful-minded fellows that would extract the first premolar in a good many cases of distoclusion. I am free to confess that we find it almost impossible to treat a true type of distoclusion without extraction after the developmental period and keep it in position. We have corrected these cases without extraction but after two or three years we find there is a gradual receding back to the old position.

We wanted some form of improvement. In our clinic we are forced in many cases of distoclusion after the developmental period, to extract the first premolars and retract the anterior teeth. These cases are a joy to us when they return six, seven or ten years later, because the teeth stay in position. We hope at some future time to show quite a number of cases that have been treated that way. We have established good function, mastication goes on normally and the patients are satisfied. Then, again, I recall cases I treated many years ago, that I exhibited before this Society, which were treated the old way, that is,

with the usual appliances and intermaxillary ligatures in order to bring the mandibular teeth forward. I had beautiful models and fine looking Apollo-like faces following this treatment. They are anything but normal now.

In treating any malformed jaw, it is important that we consider function, because function determines structure, and in order to place the tissues so that they functionate properly. we must possess orthodontic judgment. In surgery, for instance, in performing a harelip operation, the parents may ask me, "How do you know when the lip is going to be long enough or short enough after you have united it?" That can only be determined by what we call surgical judgment. Our knowledge of anatomy, physiology, shape, form and growth of the tissues, is what determines the artistic form that we wish to obtain, and this can only be done by having a mind that can formulate judgment in orthodontics.

Dr. Simon.—I am sorry that I speak English so very badly and that the gentlemen who have spoken on this subject have misunderstood. I am glad that it is not necessary for me to answer all the points that were touched in the discussion because all opposite meanings which are possible in this subject have been already discussed in my book and in the other book which I will present to you. I hope that these two books will be translated into English during the next month, and I beg you all, as far as you are interested in this work, to read them, and, of course, to read them not only once but three times.

The subject is very dry. It is not difficult at all to apply this method I have demonstrated to you in practice. It is very easy and I can assure you if you use this method you will be very happy and satisfied with it. These methods I have demonstrated to you are not the result of theoretical thoughts behind the writing table, but they are the result of a very long and assiduous practical experience with hundreds and hundreds of cases. If you come to Berlin I will show you very willingly my great collection of models and curves, and you will find many of my students and colleagues in Germany who have treated the same object and have made studies in it and have established my conclusions.

Of course, it is also necessary for you to study the theory; therefore, I must get you to study these books. There you will find all the theory, not only in the dental field but also the anthropology and the pathology of the constitution, the idea of the known. especially in philosophical relation. I hope you will find all that in this book.

It is impossible to treat this question in a discussion, please believe that. I would be obliged to speak for hours and hours here to cover it. Perhaps I will discuss some points here.

For instance, there is no question but that no point of the skull or the head is fixed. There is no question at all. Therefore, by and by you have the difficulty of treating this problem with the usual methods of natural science. If you use the methods of natural science, you will never find any research regarding the norm. In Nature there is no norm; there is only difference. No two individuals in the whole world are alike in any relation, please remember that. So it is impossible to find a norm in the natural life and, therefore, because it is impossible to find a norm, it is not necessary to look for it. You understand it is not necessary.

Scientific man may be as scientific as he will but he cannot find a norm and he is traveling on a false road if he tries to find a norm in this way. Therefore, all points, especially those mentioned by Dewey in relation to this, are in quite another world from this standpoint. You must study not natural science if you would find a norm for the practice, but you must look for philosophic and logical methods and that subject is difficult to speak on here. This phase is a little remote from us dentists. One must study philosophy, not dentistry, not medicine but the right philosophy, the logic. I have studied all the old philosophers, Aristotle, Plato, Kant, and you will find their names in this little book. You will see my object and I hope you will agree with it.

I know now quite positively that there is no other way for us in orthodontic diagnosis; it is not possible. Of course, you can change or alter my methods, instruments and the manner of measuring, but that is not important. You can take points of the face if you wish, but if we are to have a system, a scientific closed system, then we must take some part, we must not question if this point is better than that point. All points are equally

good or equally bad. There is no question if the points are right, the question is only if they are useful.

In the whole system I have demonstrated to you there is no question of scientific truth. In the natural thing there is no truth, because our understanding is much too small to comprehend it. We understand nothing from natural things. We are only on the surface and all we can do is to find a view, a system, not the truth, but the systematic way to make it all in all the application of real things. The real things for us are the anomalies. So I hope I have said all which can be said on this subject.

Ferris asked a question as to whether the points are fixed. I have said before, the points are not fixed. It is not a question whether the points are fixed; it is only the question of their usefulness. There are a great many things I could say here but it is impossible, I must abbreviate. Please read this book and you find all that you look for.

Federspiel has spoken very interestingly. He has touched etiology of which I have not spoken. I have spoken of diagnosis. but that is quite another subject. I have studied etiology very thoroughly and after many years of study I am very skeptical. If you have mandibular retraction, (that is the example you used) it is not an etiologic fact but it is a measure, and the measurement method is the only exact, correct and sure method.

In the etiology of the anomalies all is fantasia, all is fancy. For every anomaly there are a great many possibilities of how they might occur and it is impossible to find out in a special case the cause of it. If you study the philosophy of these things you will soon find out that there is not a pathologic cause for these anomalies; that there is no special cause. There is the constitution and condition of the individual to be considered, and many other things we do not know about. It is best for the practitioner to let etiology alone. The best way, in my experience, is to measure the anomaly and its distance from the known. The known is not a natural thing but fiction. Then you will find that this is the best way to conduct research in practical treatment of patients.

There are many things I could relate here. This whole subject is very interesting, not only to the dentists and the orthodontists but to all educated men. I am very glad to have entered upon this subject.

I thank you very much for your great attention. I thank the gentlemen who have spoken in the discussion for the praise they have given me. I am very glad to have been able to come to America; I am proud of it, and I hope the modest words of my work, the ideas I have had the opportunity to give you will find good soil in America.

THE USE OF ROUND WIRE IN BRACKET BANDS PRELIMINARY TO ADJUSTING THE RIBBON ARCH*

By C. A. Hawley, D.D.S., Washington, D. C.

THIS paper does not intend to deal with or argue for the use of the ribbon arch as opposed to any other appliance. It is presumed by the author that orthodontists recognize that the ribbon-arch appliance has well-known and distinct advantages in certain cases. It will not even deal with the selection of those cases where the plain labial arch, the lingual arch, or the pin and tube appliance is indicated, interesting as such a discussion might be. The case for the ribbon arch as opposed to other appliances has been argued by Dr. Robert L. Strang in a paper entitled "The Limitations of the Lingual Arch

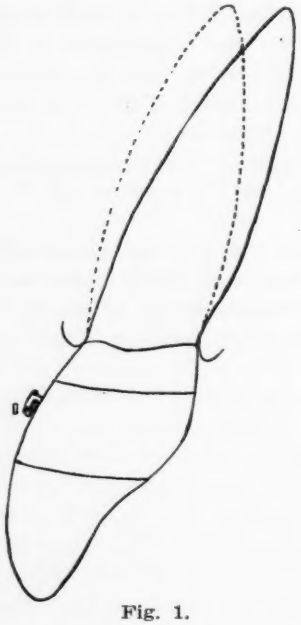

Fig. 1.

Fig. 2.

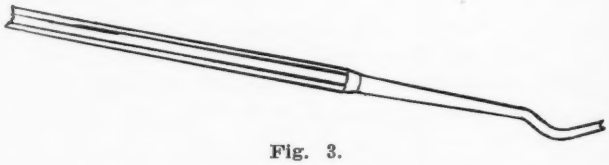

Fig. 3.

Appliance," read before the Eastern Association of the Graduates of the Angle School, May 28, 1921, and published in the Dental Cosmos, January, 1922, to which I would refer those who are interested in that phase of the question.

The use of the round wire preliminary to the insertion of the ribbon arch has so satisfied me and given so much comfort to my patients and has so obviated the serious difficulties that I experienced in the first insertion of the ribbon arch that I am venturing to present this subject in a separate paper for the purpose of emphasizing and attracting your attention to this practice.

*Read before the American Society of Orthodontists, Kansas City, Mo., March 18-21, 1924.

The use of the ribbon arch in the first stage of treatment is attended with two difficulties:

First, the difficulty of so bending the arch, no matter how well softened by heat treatment, that it can be inserted in the brackets without so much force as to cause too sudden and violent movement and consequently considerable pain and soreness.

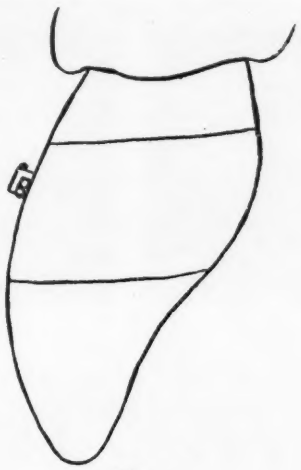

Fig. 4.

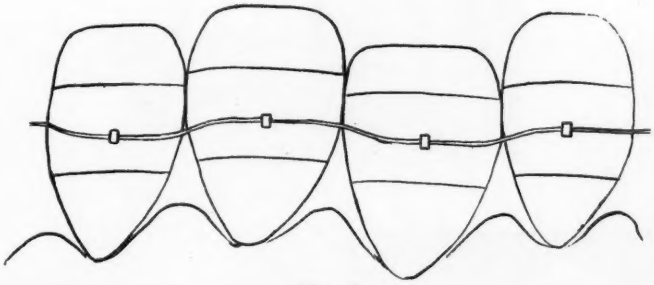

Fig. 5.

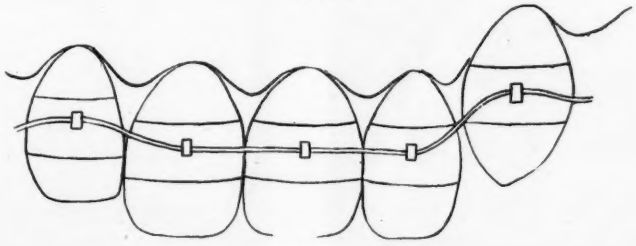

Fig. 6.

Second, the beginning of movement when so used necessarily causes root movement as well as alignment and rotation at the same time, which I believe is not the best procedure. The character of movement initiated when the ribbon arch is first used is illustrated by Fig. 1.

This application carries the end of the root of the tooth forward rapidly through the process at the start. It is usually accompanied with rotation and some labial movement of the crown, a combination which is undesirable.

To obviate these undesirable features in the application of this arch at

the starting of treatment, I have for several years been using a round spring gold wire to which ends of the ribbon arch have been soldered for starting movement (Fig. 2). This wire may be 18, 19, 20, 21 or 22 thousandths of an inch in diameter. The lighter wire is selected if considerable bending is necessary and later substituted for one of the larger sizes, as the nature of the case indicates. The screw ends are used to keep the wire taut by the

Fig. 7.

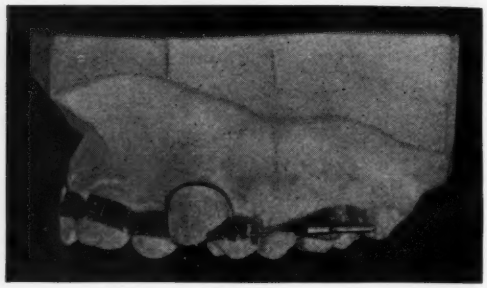

Fig. 8.

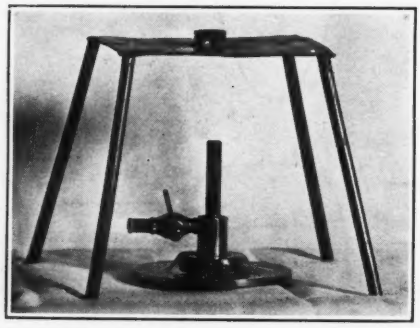

Fig. 9.

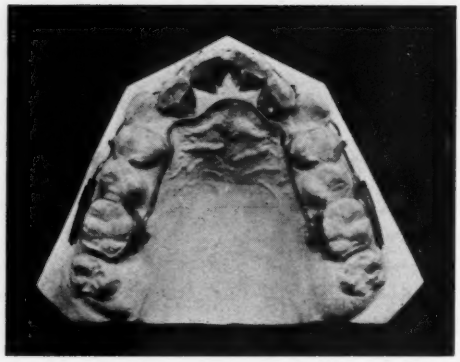

Fig. 10.

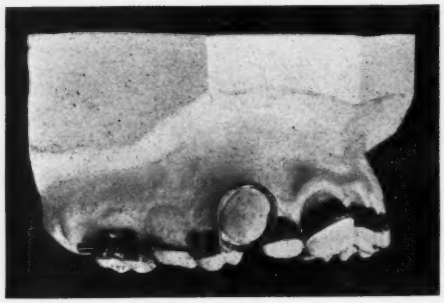

Fig. 11.

occasional turning of the screw, which adds to the efficiency of the wire. These screw ends are cut from used and discarded arches.

This round wire arch can be easily placed in the brackets with the fingers, aided occasionally by a small fishtail grooved instrument (Fig. 3) without great stress, thus, starting the movement gently and without accompanying root movement. The round wire lies well within the bracket and the lock-pin head draws under the end, making a very secure attachment (Fig. 4). As

the wire rotates freely in the bracket, no root movement is induced and it can be inserted in places where it would be impractical to manipulate the ribbon wire.

In intrusion and extrusion movements the round wire is gentler and safer and has more latitude of spring than the ribbon wire (Figs. 5 and 6).

Fig. 12.

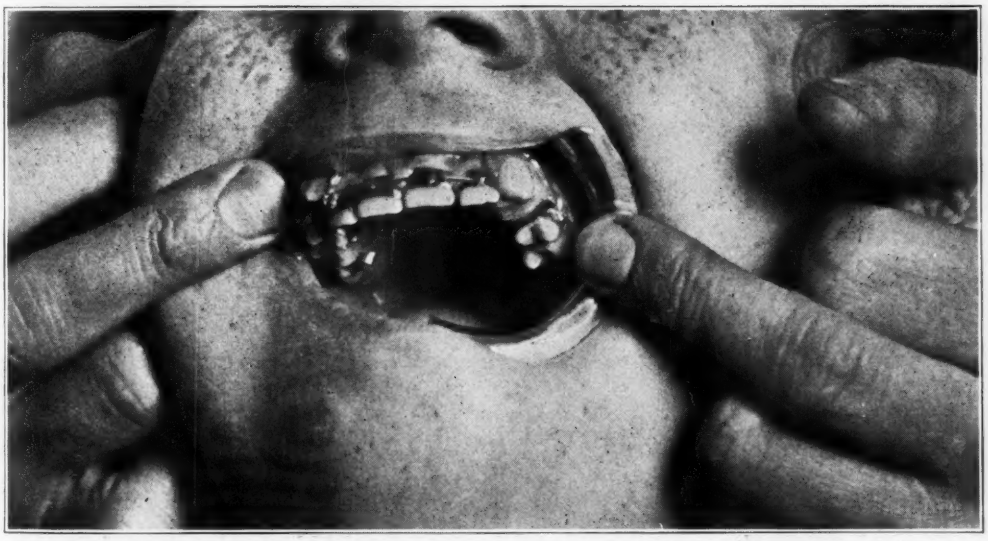

Fig. 13.

In opening spaces for canines the preliminary movement can be efficiently done with the round wire bent into a loop (Fig. 7) and substituted later, if necessary, by the ribbon arch which has been cut and a round wire loop inserted. This wire loop adds elasticity to the force exerted by turning the nut in front of the molar tubes (Fig. 8). After the teeth are in good alignment the round wire is removed and then any root movement that is desirable is commenced. The application of the ribbon arch at this time is not difficult or painful as the teeth are in approximate alignment and no considerable bending is neces-

Fig. 14.

Fig. 15.

sary. Since the teeth are under movement, the tissues are not so resistant as in the beginning. The root movement is now more nearly *en masse* and in my experience more safely and easily accomplished.

These round wires must receive careful heat treatment to preserve their elasticity. Following Williams' suggestions, I am using with good results an annealing device shown in Fig. 9. The little cup on top of the brass stand is filled with pure tin which melts at about 450° F. When the tin melts I have the approximate temperature and can maintain it for ten or fifteen minutes. At the expiration of the desired time the burner is turned out and the arch allowed to cool on the stand.

These light round wire arches and the subsequent ribbon arch are generally used in combination with a lingual arch for the expansion and stabilization of the molars and premolars (Fig. 10). The lingual arch rests securely in notches cut in the premolar bands. It is not always necessary to leave it in place during the whole treatment, as after the desired expansion has been gained, it can often be removed and the expansion held by the ribbon arch. I prefer always to have one fitted and at hand ready to use when necessary.

If the round wire arch is used in cases where considerable expansion is desired in the premolar and molar region, the premolars may show considerable tipping before the space for the canines is fully opened. If the front teeth are nearly aligned it is best at this time to substitute a ribbon arch with a round wire loop to check this tipping (Fig. 11). Figs. 12 and 13 show a case where the spaces were opened by this method and are now ready for the substitution of the flat arch.

It may be said here that the success of this whole procedure is dependent to a great extent on the accuracy of the machine-made brackets. In my experience no handmade brackets or hooks will produce the accurate and positive results attained by the machine-made appliances.

Case, in his last book, questions the success of so narrow a ribbon arch as .036 for root movement and advises the use of a ribbon .050 wide inserted in handmade brackets. My experience is that the lack of width in the .036 ribbon is fully made up by the greater efficiency of the accurately machined bracket and ribbon wire. I think that the efficiency of this .036 size arch for root movement is fully established by those who have used them. In fact, the power of this appliance in root movement is so great that it must be manipulated with much care.

I will show here in confirmation of the success of this procedure thirty-five cases treated in my office under my direction. These cases include most of the movements usually met with in ordinary malocclusion (Fig. 14). The results, showing uniform root movement, are shown in Fig. 15.

DISCUSSION

Dr. Ketcham.—Hawley has clearly explained this method of substituting a round arch wire for the ribbon-arch wire, in the first stages of treatment, in cases where later he is to use the ribbon arch in the bracket bands for stimulation of root movement. The discussion must be limited to this. I will say that Hawley's experience in this procedure has been much more extensive than mine. At the beginning of tooth movement, I have been

more given to slipping the ribbon arch into two or more brackets upon teeth where it can be adjusted as near passively as possible and ligating the other teeth out to the arch; but I believe Hawley's method of using the round wire, from .018 to .022 diameter, (and you will remember the dimensions of the ribbon arch are .022 x .036,) will do away with a great deal of the difficulty often experienced at commencement of treatment in adjusting the ribbon arch. The small diameter round wire will move the teeth with a minimum amount of soreness to the patient and a minimum amount of trouble to the operator.

The loop over the canine, which he has illustrated tips the incisors forward and the premolars outward, and does it better at the beginning of treatment than the application of the ribbon arch. Hawley has used the lingual arch in connection with the round wire to a considerable extent. My experience has not been extensive enough in using the two in combination to add anything of value to what was said. My tendency is to keep appliances down to the minimum for the sake of simplicity.

He speaks of the ample power in the .036 breadth of the ribbon arch to move the roots of teeth efficiently, and I wish to confirm this. In fact an arch narrower than that made on the same principle is efficient in moving the roots of the teeth. Oftentimes we find that we have more power than we need and that we have to be very careful in its application. The fit of the ribbon arch to the brackets is so accurate that the least little twist is transmitted to the tooth and to the tooth root, and that is why the round wire helps so much at the beginning of treatment.

I beg the chairman's pardon, and also Hawley's, for digressing just this much to say that in moving molars forward the application of the ribbon arch to the anterior teeth gives secure anchorage so that there will be very little, if any, lingual movement of the anterior teeth. Therefore, when you have teeth which are condemned in the molar or the premolar region and it is necessary to remove them, teeth posterior to these may be moved forward and the spaces closed without causing a retrusion in the anterior portion of the arch.

Dr. H. C. Pollock, St. Louis, Mo.—I have no particular discussion to offer for the reason that my experience in the use of the round wire has been very much limited. I have used it on just a few cases and only recently, and its result has been highly satisfactory so far. However, I realize we are still in the experimental stage with it and have a long way to go in experience with it.

I have been intensely interested in the remarks of Hawley and his description of the round wire, and while experience has been limited, it seems to me that the theoretical idea of the round wire is to be taken seriously; it seems to me that it must have a place, in conjunction with the brackets.

I have also been interested in Ketcham's remarks. The ribbon-arch wire, it is true, has its limitations, particularly, as Hawley has pointed out, in the first stages of treatment when it is necessary to engage the ribbon arch in bracket bands. We have all experienced the difficulty of having inflammation set up in and about the teeth, being unable to adjust the ribbon arch sufficiently passively to secure the ribbon within the brackets.

Dr. Suggett.—I have not had any particular experience in using the round wire in the way, mentioned by Hawley, as I have generally made that movement with the lingual wire until there is a time for making some root movement, but the results that Hawley has obtained speak for themselves, so there is no argument on that point. The result was very fine.

Dr. Ferris.—I have used this combination of Dr. Hawley's on a number of cases in Class II, Division I (Angle), where I have tipped the incisors labially, also in lingual version in Class I. The round wire serves me very well in that class of case.

Dr. Hawley (closing).—I am very much pleased with the discussion and the reception of the paper. I do not want it to be understood that I am opposing the ribbon arch. In fact, I am very much in favor of it where indicated and where properly manipulated.

Some think that they can and must adjust the ribbon at once, in the beginning where the teeth are out of alignment. It can be done, but is impractical and unnecessary. I take it that all the claims against the ribbon arch, for instance, that its action is not in accordance with biologic development, are due to improper manipulation. Carefully and properly used and with this addition to the technic described in this paper, I know of no appliance that more completely conforms to biologic principles.

THE NEED FOR SYSTEMATIZED DENTAL THERAPY IN CHILDREN*

By M. L. Cohn, M.D., San Francisco, Calif.

DENTISTRY is primarily and essentially a medical science pertaining to childhood. It begins from the time of conception and perhaps before, heredity playing a definite rôle in dental development. Intensive study and preventive therapy should be the main weapons of the modern dentist. Dentistry of the mature resolves itself in most instances to the correction of preventable conditions, not necessarily connected with the teeth directly, but with remote ailments, which never occur to the dentist of today.

The fault exists with the dental school. Dentists should have a medical training in order to better understand the underlying elements responsible for diseases of the teeth. These dental defects in most instances are merely physical signs along with many other physical signs, which if recognized by the dentist would better enable him to cope with the condition.

Dentistry is just as much a branch of medicine as is ophthalmology or otorhinology or dermatology, and the dentist should be just as well versed with systemic medicine, physiology, pathology and physiologic chemistry as are the men who treat diseases of the eye or the ear, nose and throat or skin.

Dentistry to my mind is too highly specialized. It is not unusual to find, today, men who do extractions only, or who treat only pyorrhea or who only do fillings. It appears to me rather far-fetched to spend four or five years to be able to extract a tooth or to properly fill a root canal. I believe the time will soon arrive when the dentist will be able to handle properly any pathology of the oral cavity from assisting the eruption of the deciduous incisors to the proper care of an osteoporotic mandible or a malignancy of the jaw bone, along with the diagnosis of underlying systemic causes for various dental defects. This, to my mind, is a dental surgeon as he should be.

You gentlemen are all too well acquainted with the experience which many of us have each day when we advise a mother to have her child's carious teeth attended to and meet with the response that she has already sought dental advice and is given assurance that the child's teeth are only temporary organs and that any endeavor to correct them is unwarranted. Who is more deplorable than this individual, who is either too lazy or too ignorant to administer necessary treatment? Or is it necessary: is he right? We think not. What effort is being made at the present time to study the child's tooth? What

*Read before the Pacific Coast Society of Orthodontists, San Francisco, Calif., February 18-20, 1924.

effort is being made to correct this dentist if he is in error? Why in Grass Valley are the children having their deciduous teeth repaired and in Nevada City are these teeth neglected? (This exemplary location is not to be taken literally.) How many dentists are having blood Wassermanns done on luetic patients? How many dentists are having their children studied from a rachitic standpoint? What rôle does thumb-sucking play in dental deformities? What is the rôle of adenoids in faulty occlusions?

Are dental caries related only to the time of their existence or do they revert to the time of the development of the bud? What is the effect of infantile scurvy upon the child's tooth? Do acute infectious diseases affect the teeth? Has acrodynia any influence upon the quality of the teeth?

These are just a few of many problems that should be carefully investigated, and the dental-medical school is the only place where these phases can be scientifically studied.

We are seeing a child in the Out-Patient Department at the University of California Hospital who has erupted and has lost both sets of teeth, deciduous and permanent, and is just three years of age. He gives a history of some sort of nutritional disturbance. Otherwise he is at present in excellent condition. What was his primary condition and what could have been done to save this child from a facial deformity, which will interfere greatly with his subsequent success? What can you orthodontists do to give him a presentable appearance?

The preservation of deciduous teeth of a carious nature seems to be a rather interesting problem confronting those who see children's teeth; some fill, some clean and cauterize, and our own indifferent friends let Nature take its course. There must be some method which can be standardized and which can be taught to students and circulated to the practicing dentist.

The science of dentistry, like the science of medicine, is in its infancy. There is great need for an intensive study of families and even of races. Family histories should be taken and a history of the past experiences of the individual should be inquired into, such as diseases, habits, dietetic regimen, etc. A history of the present condition should be ascertained as well as the patient is able to give it. Thousands of carefully taken records of this type would disclose a multitude of valuable data which would at least help in solving many vague dental problems.

The dentist and the physician should work in conjunction. A blood test in suspicious dental syphilis should always be done. Correction of dietetic indiscretions in late rickets is certainly indicated. Removal of hypertrophic adenoid growths will surely assist the orthodontist in his problems. When you look into a child's mouth, see the child. Do not confine your observations to the oral cavity, but try to visualize your patient at large, his physiology and his general systemic pathology.

I recall, very unpleasantly, a case I recently cared for—a boy who complained of toothache. He had just returned from the dentist while I was visiting his brother. A few hours later the mother called me, stating that the little fellow said he had no toothache, but said it was his ear that pained.

The ear drum soon perforated and he developed mastoiditis, a subsequent meningitis and expired.

The profession is to be highly commended for its active propaganda regarding dental hygiene, which has of late years been reaching previously hidden fields. Much time should be devoted by the dentist in preaching tactfully such health measures, and talks before clubs and other gatherings should be utilized to teach the public.

In concluding this paper I wish to emphasize the following points:

1. Dentistry pertains essentially to childhood and to the prenatal period.

2. Dentistry is a branch of medicine, and is fundamentally related to the body in general.

3. Intensive study of the teeth of children histologically and systemically is indicated, and careful histories should be taken to complete this study.

4. Standardization of therapeutic methods in the case of children's teeth should be inaugurated by the dental colleges and comprehensive articles published for the benefit of the practitioner.

5. Attractive hygienic propaganda should be introduced to the public from infancy to senility.

6. The ideal dentist is the man so trained that he understands the body physiologically, pathologically, and its relationship to oral defects. He should be able to efficiently care for all conditions existing in the oral cavity, and to recognize their relationship to general systemic disturbances.

DISCUSSION

Dr. Thomas E. Sweet, Oakland.—Dr. Cohn has written a very interesting and timely paper on a subject that is of vital interest to us all. It is also a paper that has many points which should bring out a great deal of discussion.

Dentistry is, without question, a branch of medicine, and should be practiced as such. This no one can deny any more than one could say that the tissues the dentist is called upon to treat are not a part of the human body. It would certainly be ideal if the dentist could be as well-versed in general medicine as are the medical men, but under present conditions this cannot very well come to pass. The time alone that the student would have to spend in college would be prohibitive.

Dr. Cohn thinks that dentistry is too highly specialized, but upon this point I cannot agree. The field of dentistry has, as medicine, become so broad that it is extremely hard for a man to become very proficient in all its branches.

From the standpoint of the public, is it not better to have men that are especially well trained in the treatment of pyorrhea, prosthesis, root canal work, extraction or orthodontia, than to have men who can do them all fairly well?

The solution of our problems seems to me to be a common meeting ground for dentist and physician; that each goes on in his special work and that each feels a little more dependent on the other. In this way each will have much more time to spend on his own work, thus perfecting himself, and he will therefore be of a great deal more value to both himself and his patients, than if he tried to cover the entire field of medicine and dentistry.

It is very true that children have been sadly neglected, in many instances, in the past. Probably the greatest advancement the dental profession has made in the last few years, is in the care of deciduous teeth and I fully believe that the future progress of dentistry will be made along this line.

Some of the best efforts of the country are being made to study the child's dental problems. We have a number of institutions, such as Forsyth and Rochester,

doing excellent work. Many of our universities have put in special children's departments and their graduates are going out very well equipped to care for the child.

The dentist has long known the rôle the adenoid, thumb-sucking and diseased tonsils have played in faulty occlusions, and has probably been much more aware of their results, than have their medical brethren. We also know that the skin diseases contracted during the period of tooth development, may very well affect the teeth.

The dentist and physician should work together and both realize that they are dependent on one another for their best results.

Dr. Guy S. Millberry, Dean Dental Dept. University of California.—I was quite interested in hearing Dr. Cohn's paper, especially because we have been trying to work out these problems in his field as well as in orthodontia. The problem presents itself from the standpoint of developing dental education. Dr. Cohn may be interested to know this society has indorsed a plan whereby graduate instruction in orthodontia will be given in the dental school, and it carries with it, aside from clinical and technical instruction, more knowledge of zoology, anatomy, etc., and will deal especially with heredity and environment, child psychology, etc. In children's dentistry we have tried to establish a concept of the work that every dentist should appreciate. Ten years ago we had two lectures on operative dentistry and three laboratory periods. We added to that, dental porcelain. Then came the field of mouth hygiene and periodontia, and we added a lecture course and laboratory requirements. Then we added root canal therapy. This was followed by children's dentistry and there was added a lecture and laboratory period. So we have four times as much lecture work in operative dentistry and three times as much laboratory work as we had a few years ago. Now we have reached the stage where the student evades everything he can. We want every student to go out with a better knowledge of children's dentistry than he has ever had before, but the element of time enters into it and we have suggested that children's dentistry should be made elective, as well as orthodontia and oral surgery so that the men shall be allowed to complete their knowledge of subjects in which they are particularly interested. A man cannot meet the State Board requirements and perfect himself in every branch in four years. An orthodontist coming from the East after practicing ten or fifteen years, might meet with difficulty in passing the State Board as he may not be prepared in the later methods in general practice.

Doctors McDowell, Ford and I had a five hour conference recently with the State Board here, and we discussed the idea of making it possible to take examinations in the fields in which men are particularly interested. At the present time if a man has to do as Dr. Cohn wants him to he cannot carry the work and meet the State Board requirements in the four year period. We must all insist on broadening, and you from your point of view and others from their point of view will welcome a change that will allow a man to do the thing he wants to do. We realize with Dr. Cohn, and have deprecated more than he, the attitude of many of the older men in the care of children's teeth. We have been confronted with it for ten or twelve years. Everywhere in the state that attitude prevails—the older man does not want to take care of children's teeth. Whenever the people come back to us with complaints of this character we tell them to go to a dentist who will give them service. One of these dentists may come to us and say we are interfering with his business, but we are concerned with the welfare of the people of the state. If a man will not live up to the ideals of dental practice we should tell the people what they have a right to expect from our profession. We have been criticized for spending so much time in attempting to bring to the public general information about the health and welfare of the children of the state. If we do not educate them, who will? The hardest problem in our institution is to meet the requests for information in the matter of children's dentistry. We have five people in the department with Dr. Cameron in charge on full time service. He has one thousand orphans and half orphans to look after for the Associated Charities. That keeps two interns busy. Even then it does not cope with the problem. Dr. Cohn has one hundred and fifty children coming to the clinics every month. There are 86,000 children

in San Francisco and if all the dentists in the city devoted themselves exclusively to children's work they could not take care of this number if they forgot everybody else in the city. If we proceed, as Dr. Cohn has suggested, to a more advanced knowledge in medicine, pathology, and physiology than we now require, that will reduce the number of persons who can take care of the children.

I think personally that a man with four years of proper training can do good children's dentistry if he is not obliged to go into all other fields of dentistry and make a thorough specialist of himself in those fields. We can make it possible for the girl (who is better suited to handle children than a man is) to devote the major part of four years' time in this study and she will make a better children's dentist and do more work for the children than is now being done. If we could do that the children of our community would be better off. We are just in the developing stage, but we are looking forward to perhaps a greater division of dental practice than Dr. Cohn thinks. It is for the betterment of the child. The man doing orthodontia cannot do general practice successfully and I dare say you will agree the man doing children's work would be better off if he confined his efforts to that work and did nothing else. The pediatrician has found that out, otherwise he would not limit his practice to children.

Dr. Thomas E. Sweet, Oakland.—With regard to Dr. Millberry's discussion, I think the point of view of the general practitioner is a very important one. If we divide dentistry as he suggests and train men only in some particular line of work, are we not going to develop a number of men who will not have a particularly broad viewpoint of dentistry or medicine as a whole?

John Albert Marshall.—Dr. Cohn states that the fault (assuming that there is a fault) with the majority of practicing dentists lies at the foundation of dental training. If a poll should be taken from all the practicing dentists in this country as to the relative parts played in dental practice by medical sciences and technology, it would indicate that technology played the greater part. This does not mean—nor do I wish to imply—that medical sciences are unimportant; they are of very great importance, and we need, as the doctor has suggested, increased facilities for the study of the medical sciences. We should be glad if Dr. Cohn would suggest some means by which these facilities could be obtained. I would have included in the doctor's list, the additional sciences of Anatomy, Physiology, Bacteriology, Pathology and Physiological Chemistry. The fact that the students receive *some* training in these fundamental medical sciences is, of course, well known, but that the training is not adequate nor comparable to that received by the medical man is also acknowledged. I do not believe that with our present system of dental training, the dentist should attempt, as suggested by Dr. Cohn, the treatment of osteoporosis or of carcinoma or *sarcoma*. That belongs peculiarly in the realm of the surgeon. Even the diagnosis of these conditions is a difficult task for the surgeon, dermatologist and pathologist, and assuredly the treatment of them does not belong to dentistry.

Dr. Cohn calls attention to a fact of which we are aware—and which we deplore—that many dentists do not accept children as patients. This is admittedly an unfortunate condition. If we could follow all over the country the example which has been set by some of the Eastern cities and bring in dental hygienists to the schools, the children would be taught the care of the mouth and teeth and there would be fewer carious deciduous teeth.

Those of us who heard Dr. Arthur Black on his recent visit to this coast will recall some astonishing facts and figures which his survey of dental prophylaxis and oral health has brought forth. The simplicity of this treatment is its worst enemy. If the children had to take serum injections or pills, the public would perhaps feel more willing to support dental hygiene, but since dental hygiene simply means the systematic care of the teeth three times a day, it is too paltry a propaganda apparently to warrant civic interest or support. Although California has the largest number of dentists per thousand of population of any state in the Union, there is still a lack of dental service.

This lack is not so much of that type required of the *dentist himself,* but rather that which may be given by dental hygienists in the public school. We have sought many times to start at the root of the evil. We had a Bureau of Dental Hygiene in the State Board of Health—a bureau which in its short life carried oral health propaganda to over three hundred thousand people in this State. Unfortunately, this bureau was discontinued by the present state administration.

When Dr. Cohn asks how many dentists are having blood Wassermanns done on luetic patients or how many dentists are having their children studied from the rachitic standpoint, he may just as well ask that question of many members of the medical profession. I think there are just as many dentists who are interested in these points as there are medical men. Dr. Cohn's criticisms perhaps come more from the fact that he has not given the subject of dental education the serious thought and study that some of the rest of us have accorded this subject. He will find that thumb-sucking and many other habits related to the development of malocclusion have been decried in dental literature from time immemorial. Adenoids have also been mentioned for many years as a predisposing cause to faulty occlusion.

His next point refers to the etiology of dental caries. It is usually acknowledged that dental caries is related primarily to the time of its existence rather than to the development of the epithelial bud. Faulty formation, as shown in hypoplasia, may predispose to the condition. This also has been taught in the dental colleges for a considerable period of time. The effects of infantile scurvy upon the child's teeth are well known, but the treatment is for the pediatrician, so far as diet is concerned and for the dentist in so far as local measures are concerned. Local measures, however, without adequate diet, or adequate diet without local measures, are both ineffective. It has also been taught in textbooks of dentistry that the exanthematous diseases, when acquired by the child at an early age, frequently leave their mark in hypoplasia of both dentin and enamel.

The standardization of dental practice is in exactly the same state as the standardization of medical practice. Both are empirical sciences rather than exact sciences. If the medical man always gave a dose of calomel to every patient who came into his office, he could be said to have well standardized his practice. If the dentist pulled every tooth that seemed diseased, he also might be said to have well standardized his practice. Both procedures however, might make the practitioner liable to criticism. However, the dentist realizes perhaps as well, if not better than the medical man, that dentistry is in its infancy. We have been treating *effects* and not *causes* for a great number of years and will continue to do so until the metabolism of calcium has been worked out with the same degree of detail by the physiologists as the metabolism of iron. Caries and pyorrhea are both concerned with calcium metabolism. Local causes, of course, play the important parts, but the significance and importance of systemic conditions of the individual have only been recognized of late years. Closely associated with this is the etiology of malocclusion. We recognize that habits of childhood tend to deform the arch, that hereditary influences play some rôle; that environment, that diet, that general nutritional conditions are of importance, but we cannot always ascribe definitely, a *first* place to any of these influences. We wish that the physician would cooperate more with us in our work but many of us have had the experience of the physician not giving proper thought or care to our inquiries. It is quite possible that we have not couched them in the correct language, but our fault in that regard is not worse than that of the physician when he attempts to describe dental lesions. Particularly is this true of radiograms. Of course, dentists also make similar mistakes in radiographic interpretation which are even more deplorable.

I am sorry that Dr. Cohn has so little good to say of the dental profession. Some of our faults we know of and are trying to eliminate; others which he has mentioned are new to us, and we will enquire further whether or not his criticism is just. It is by knowing and recognizing our faults that we are placed in a position to correct

them. If, however, they have been overemphasized, through a misunderstanding of conditions, our plight is not so serious.

Dr. George A. Barker, Seattle.—It strikes me that the physician has a peculiar hold upon the public in that he has contact with and the confidence of a greater number of people than the practicing dentist. Thus through the physician we should be able to reach out and get hold of many cases that would otherwise escape us. If the physician in his work in the school paid better attention to the diagnosis of the different troubles of the mouth—caries, malocclusion, beginnings of pyorrhea, etc., we could get valuable assistance from him in that way.

Dr. Carl O. Engstrom, Sacramento.—Dr. Sweet has made a remark about the narrow-mindedness of the specialist which I think should not be passed without a statement in regard to the orthodontist in particular. Narrow-mindedness is due to a lack of broad knowledge, to a confining of the interest to too narrow a scope. We have limited our field of execution particularly to the treatment of malformations of the jaws, most of which are of a technical nature. On the other hand, it is apparent to any one today that the scope of knowledge in orthodontia is ever broadening, and hence the orthodontist should in his progress become more broad-minded.

Dr. Vance Simonton, San Francisco.—As I sat listening to the various discussions, my mind kept drifting back to the case which Dr. Cohn presented. When confronted by such a case, we must confess that we know nothing of practical benefit to that particular patient. While scientifically the simpler cases are of more interest because of the enhanced opportunity which they afford for detecting etiologic factors, yet such conditions as we have just seen, awaken our sympathies, bring forcibly home to us the ultimate humanitarian nature of our calling, and inspire renewed efforts to understand and control them.

The roots of our problem are so firmly planted in the fundamental sciences, and ramify so deviously through them; the subject matter of the various sciences is becoming so great, the technic so involved, that according to our present judgment the greatest hope of progress lies in cooperative research.

Dr. Cohn has stressed the desirability of closer cooperation between physician and dentist, yet here is a case baffling to physician and dentist alike. It would seem that the next step is group research by clinicians and scientists.

There are three important fields open to a conscientious worker in medical and dental science. He may choose to devote himself to intelligent and skillful application of the practical data available to his profession, he may work in the fundamental sciences, or he may attempt to bridge the interval between the two, carrying over into clinical practice and making quickly available the advances of the biologic sciences, on the one hand, and on the other hand, bringing constantly to bear upon practical procedures the critical analysis characteristic of laboratory research.

The latter type of worker is the most rare of the three at the present time. The method we are following in our group represents an effort to combine all three desirable factors, not in any one person, but by a close association of workers in the various fields involved.

Dr. Robert Dunn, San Francisco.—I cannot refrain after hearing Dr. Cohn's presentation, from giving expression to some of my feelings. If Dr. Cohn and other of our medical friends who are disposed to offer criticism of our activities, had any conception of what we are doing they would be less prone to make statements not based upon facts. We always enjoy a presentation of anything along their particular line of work, and there should be opportunity for real accomplishment through such an interchange. However, when such criticism is offered as was the case here, it is high time our medical friends are given to understand that we are not asleep but are making a study of causative factors, and that we are in reality accomplishing wonderful things.

Dr. Leland E. Carter, San Francisco.—Like Dr. Dunn, I feel that medical men scarcely realize the very great attention we are paying to the problems in question. Especially in the past three or four years have orthodontists been keenly alert to the things referred to by Dr. Cohn. It is true these questions are not of the nature to be solved in a day, but we do have them under serious consideration in all parts of the country.

Dr. M. L. Cohn, San Francisco, closing discussion.—I think Dr. Barker's criticism is very fair. I do think that in medicine we are not sufficiently familiar with dental problems. We must admit that more attention should be paid to mouth conditions. I know it is a commonplace even in the University of California Medical School, which is considered a first class institution, for men to graduate without any knowledge of the time of the eruption of the teeth or of the simplest dental problems. In discussing this subject I feel I have taken up the idealistic standpoint. A number of years ago the physician was not trained in medical schools. He worked in the office of some physician, who had also gone through the school of experience, and after a short period of study he was prepared to take the examination, which gave the degree of M.D. Then it became possible for a man to graduate from a Medical School in a one year course, then in two years, three years and then in four years, and at the present time the trained graduate puts in seven years as a minimum. He gets the academic degree after four years work. The first year in medicine proper gives him the degree of B.S. or B.A. You feel that four years is sufficient time for the dentist. That is well and good for the present. However, you will all look back in time and wonder how you ever completed the course in four years. I dare say some of you here have gone through in a two or three year course and have perfected yourselves in postgraduate work. I feel there is an ideal in dentistry. It may not be practicable at the present time and there may not be the opportunity now to take the prolonged course in dentistry, but nevertheless the ideal of the profession will be presented to the public at large so that there will be far more applicants than now, notwithstanding the lengthening of the course. Only a few years ago the medical profession had to go out and scout for candidates for the course. Now we are overcrowded. At the University the attendance has increased from 1913 with twenty-six students to more than fifty graduating now, so that we are not really able to take care of them. It is not the increase in the length of the course that will alter the attendance if the profession is idealized to the point that we desire to adequately train young men and women in the work. The medical people criticize the branch of the profession dealing with the ear, nose and throat; also dermatology, and we consider those fields much limited. When we think of the specialist in dentistry it recalls the type of individual who goes through a curriculum of seven years and decides to do nothing but remove septums and operate on antrums and adenoids. So the same condition is possible in nose and throat work as exists in dentistry. The time is coming—and it exists in Europe—when the dentist will have to be graduated from a medical school, and specialize afterward in his selected branch of work. I feel there is a big field in dentistry, and that dentistry is essentially medicine.

CLINIC*

By James D. Locke, D.D.S., Grand Rapids, Michigan

AFTER working for some time with the lingual base wire and auxiliary springs with varying degrees of success and failure, not unlike the experiences of other men with whom I had talked, I became impressed with the thought that it was extremely difficult to exert force with the larger gauge auxiliary springs without creating other disturbances in the mouth. Therefore I resolved to try and work out some plan whereby I might be able to use lighter spring forces and still have them effective.

With this in mind I first adopted the 24 gauge, then 25, and finally a 26 gauge spring wire, each against an 18 gauge base wire. However, for some time past I have been using a 17 gauge base wire with 26 auxiliary spring wire.

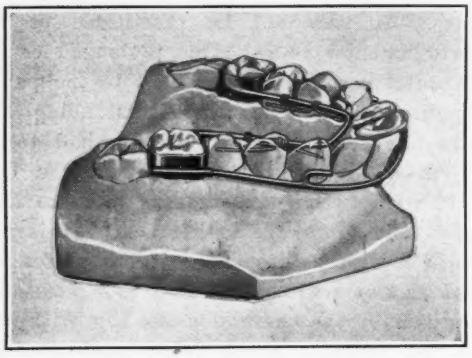

Fig. 1.

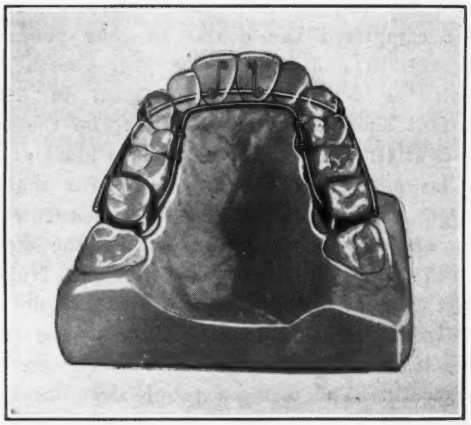

Fig. 1.

My reason for the discrepancy between the gauge of the base and spring wire, is that a base wire when used with auxiliary springs, must be accepted as anchorage, inasmuch as it functions as a base for attachment for spring wire forces, and the larger sized wire should insure more stability of anchorage.

To put this principle into application, I found it necessary to wrap the spring wire around the base wire. This increases tremendously the resiliency of the spring force of the lighter wire, as the wrapping produces a coil spring which functions back to the point of attachment. This can readily be seen by the use of a magnifying glass. This principle of wrapping the smaller wire around the base wire has opened up a field of usefulness beyond my original anticipation. Moving teeth in the line of the arch, displacement

*Given before the American Society of Orthodontists, Kansas City, Mo., March 18-21, 1924.

of molars distally by a free tube and special spring force, bringing centrals together and back into the line of the arch (frenum cases), depressing or elongating teeth, rotations, or practically any movement desired in orthodontia can be effected in an easier and better way in my practice than it has ever been my privilege heretofore to have known.

Before going into the detail of construction, I should like to say that tendency to displacement and breakage of the smaller spring wires used as I shall describe, is no greater than in other forms of attachments. The range of activity which it is possible to secure by being able to put a more comprehensive spring in the smaller wire and still get it out of the way, admits of a longer period of usefulness and fewer treatments.

To secure lateral expansion in the premolar region, as shown in Fig. 1, the spring wire should be soldered lightly along the long axis of the base wire towards the floor of the mouth on the lower, and the palate on the upper, just distal to a point marked midway between the two premolars, so that the wrapping of the spring wire will come at the point marked on the base

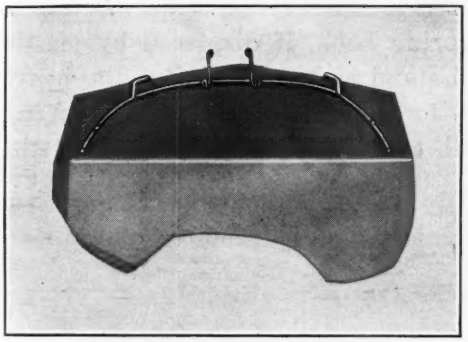

Fig. 2.

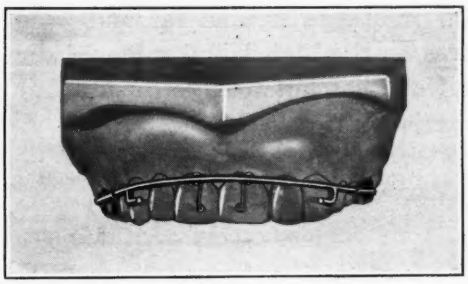

Fig. 2.

wire between these two teeth. After soldering has been completed, the base and spring wire should be immediately dipped in cold water, to prevent breaking of spring wire when bending takes place.

Take the spring wire between thumb and first finger and bend it abruptly at right angles to the base wire toward the tongue, wrap it closely, twice around the arch, carrying the second turn well to the middle of the base wire towards the lingual surface of the teeth, then with the thumb and first finger of the right hand bend it sharply forward using the finger nail of the left hand to hold the spring wire in position against the base wire. Reflex the spring wire at a point opposite the mesiolingual angle of the first premolar, and cut it off at a point opposite the disto-lingual angle of the second premolar. I have never had any success in making the right hand bends in the smaller spring wire with pliers.

With a pair of smooth nosed pliers without any sharp corners, adjust the reflex spring into position so that when the appliance is set in the mouth the spring will literally disappear from view, and thus will cause no discomfort to the patient from the standpoint of the tongue or soft tissues. The pressure is registered on the teeth in such a mild manner, that there is

at no time the slightest degree of soreness of the teeth, after the patient becomes accustomed to the wearing of the appliance.

To widen the canine region a separate spring should be soldered on the arch as shown in Fig. 2. If possible the springs on the canine should be carried as close to the gum margin as possible to overcome the inclined plane of the canine. If using these springs on the anterior teeth, especially the mandibular incisors, the use of light bands with a stud on the lingual side to prevent the springs from climbing on these teeth and elongating the molars, is good practice.

To make the finger springs as shown on the labial arch, the wire should be soldered on the lingual side at right angles to the arch, allowing a projection toward the gingival. Take the long end of the wire and carry it over the projecting end and down on the lingual again, and cut off, leaving sufficient length to form a small loop at the end to obviate sharp points. These can be bent at right angles to the incisal edge and used to rotate incisors. These springs can be made from 25 or 26 gauge spring wire; 26 gauge is used mostly by me.

If excessive heat is not used in soldering, it is beyond belief the amount of abuse they will stand, as they will spring back, if displaced by mastication or otherwise, and far and wide will stand as much grief as the heavier wires on the high labial soldered directly to the arch. They work so prettily that one has but to give them a fair trail, to become enthusiastic about their practicability.

DEPARTMENT OF
ORAL SURGERY AND SURGICAL ORTHODONTIA

GAS-OXYGEN ANESTHESIA FOR EXTRACTIONS AND ORAL SURGERY*

(ETHYLENE-NITROUS OXIDE AND OXYGEN)

By Drs. Aaron Goldman and Julius D. Goldman

THE aim of this paper is to present the important facts on general anesthesia for extraction and oral surgery. What we state is based upon an experience of ten years in the use of N_2O and O alone, or with some synergist such as ether or anesthol or urethane and paraldehyde.

ETHYLENE—EXPERIMENTAL AND CLINICAL FINDINGS

A few months ago upon the recommendation of James T. Gwathmey we commenced experimentation with ethylene, nitrous oxide and oxygen upon white mice and guinea pigs. We soon found much corroborated that had been presented on the subject of ethylene by Brown of Toronto, and Luckhardt and Carter of Chicago. (1) Higher percentages of oxygen can be used with ethylene to secure anesthesia than with nitrous oxide. (2) Symptoms that the animal was receiving too little oxygen, and that the danger zone was being approached could be recognized easily, sufficiently before stoppage of breathing for us to bring the animal into the safety zone with ease. (3) Return to consciousness was as rapid as with nitrous oxide.

We took ethylene and oxygen ourselves, and then gave it to the office force. What we had done in animal experiments, coupled with the reports of others, justified us in using ethylene, nitrous oxide and oxygen upon patients. We have used ethylene alone with oxygen, nitrous oxide and oxygen followed by ethylene with oxygen, and later nitrous oxide followed by nitrous oxide, ethylene and oxygen. This combination at times was passed over urethane and paraldehyde. Today we believe the best results are obtained by commencing the anesthesia with nitrous oxide and oxygen, and follow-

*Includes excerpts from a clinic presented at the New York College of Dentistry, 1922, from a paper read before the Eastern Dental Society of New York, January 3, 1924, and a paper read before the Harlem Dental Society of New York, April 17, 1924.

ing with nitrous oxide, ethylene and oxygen. The anesthesia appears to be smoother than with nitrous oxide and oxygen—with or without anesthol or urethane and paraldehyde.

Nitrous oxide is manufactured in a purity as great as that the advertisements tell us Ivory soap possesses. Of course nitrous oxide manufacture has a long history behind it. As late as 1914, the Lakeside Hospital at Cleveland, Ohio, at an expense of $6,000 installed a new nitrous oxide manufacture and purification plant. Ethylene is today being delivered to us with apparently less odor than it possessed a few months ago, and as manufactured it has a definite and not pleasant odor we know, although we have been told that ethylene pure is odorless.

Our experience, and the experience of others who have used this combination is not to be considered at all final. We must remember that N_2O and O has to its credit millions of cases, while ethylene is a comparatively untried anesthetic, although experiments with it were made many decades ago, and though many more have been made within the past decade. The number of cases in which ethylene and oxygen has been used, is certainly small, compared with experience N_2O and O has seen.

ACETYLENE

Acetylene and oxygen has lately come to the foreground as a general anesthetic. Many years ago Claude Bernard experimented with this gas as an anesthetic upon birds. In the past twenty years further experiments have been made upon this gas. In 1895, M. M. N. Grahant found that it was as nontoxic as nitrous oxide; he further stated that like nitrous oxide it forms no chemical combination with the blood, and that like nitrous oxide spectroscopically there is no difference between hemoglobin mixed with acetylene or hemoglobin free from acetylene.

Beginning with the year 1920, Heinrich Wieland made extensive studies with acetylene as an anesthetic. He performed a great number of experiments upon animals, upon nematodes, upon heart muscle, both with acetylene and nitrous oxide, each combined with air or with oxygen. His studies were so gratifying that in 1923 together with Gauss, acetylene with oxygen was used for 500 operations in German hospitals, the anesthesia lasting from three minutes to three hours, sixteen minutes. Of special interest in this respect we may state that the average percentage of oxygen given the patients during the anesthesia was as great or greater than the percentage of oxygen in the air.

In a personal communication to us, from Professor Wieland dated March 8, 1924, he says that up to February 29, 1924, Gauss had used ethylene as an anesthetic in 1,396 cases. He states that the safety of acetylene is without parallel. Comparing it with ethylene he considers it far superior, in that oxygen can be used in proportions equal to or greater than that in the air. The fire and explosion hazard is the same in acetylene as in ethylene, and with both the danger is less than with ether.

In a letter to us from Luckhardt, dated April 7, 1924, written from the University of Chicago, Department of Physiology, he states the following:

"Acetylene has a number of characteristics which at present at least, are all serious objections to its use. It is more explosive for it is a more unsaturated hydrocarbon; it forms with metals highly explosive compounds, which property ethylene has not got; it has a decidedly greater objectionable odor; it attacks fillings of the teeth even in slight concentration; it must be compressed into acetone to prevent it exploding in the cylinders. Inhalation of acetone will not benefit the patient, but will tend to produce an acidosis. Removal of the acetone before administering the acetylene is not practical. These are the practical problems at present. They may be overcome. From reports it would seem that acetylene is a very powerful anesthetic."

From our experiments with Prestolite (commercial acetylene 98.5 per cent pure) and oxygen on white mice, we come to the following conclusions:

1. Anesthesia can be maintained with percentages of oxygen much higher than that in the air.

2. If a proportion of oxygen is given with Prestolite equal to that which with nitrous oxide gives anesthesia, the life of the animal is quickly endangered; death will come quickly.

3. *With Percentages of Oxygen Equal to or Greater Than That in the Air.*—(a) Many of the animals in prolonged anesthesia, for example after one-half hour showed the signs of danger by gasping. (b) Whenever they were removed into the open air upon showing signs of danger, recovery ensued. (c) When the anesthesia was continued without a change in the proportion of gases, the gasping generally continued or increased, and death followed. (d) In some cases the animals were kept in the container gasping for many minutes, and upon removal to the air gasped one, two, or three times, and did not recover.

4. Symptoms of danger are readily recognized and appear sufficiently before stoppage of breathing for us to always bring the animal in the safety zone with ease.

5. The safety margin is much more favorable with Prestolite and oxygen than with either ethylene and oxygen or nitrous oxide and oxygen.

HISTORY OF NITROUS OXIDE ANESTHESIA

Two hundred years ago a scientist looked at his log fire, the flame presented to him something real—something material being consumed. He saw an analysis of the log taking place. The flame represented one of the constituents—phlox or phlogiston. To him the soot about the fireplace was almost pure phlogiston. The "phlogiston" theory held sway for one hundred years. Its last citadel was laid low by Lavoisier, who advanced the theory which is accepted today and forms the keystone of the science of chemistry.

Combustion is not a process of analysis as the advocate of the "phlogiston" theory would have us believe, but a process of synthesis in which oxygen plays the chief rôle. With the work of Lavoisier, Scheele and Priestly a new realm of wonders was unfolded. Oxygen, nitrous oxide and many other artificial gases were discovered. Illimitable powers of creation danced before the minds of these laboratory workers.

A few years after the French Revolution, Beddoes already was somewhat known because of his radically expressed views in the politics of the day—à la Professor Beard and President Meikeljohn of our own day, and with similar results. Oxford cast him forth from its saintly shrine, to continue its hallowed slumbers, free from the taint of unconservative ideas. This young physician of thirty-two established a sanitarium for the treatment of lung diseases with the aid of the newly discovered artificial gases. The wildest advocate of the E.R.A. expects little compared to the marvels hoped for from the use of the newly discovered artificial gases of life.

Humphrey Davy, a youth of nineteen, became Beddoes' assistant and was led by fate to experiment first with nitrous oxide. For the selection of this gas we must thank the god of Accidents, who is probably the god of Progress. Davy experimented upon animals and upon himself. He soon declared that N_2O would be valuable in surgery. But although he demonstrated its anesthetic power to all the well-known chemists of England and the continent and although his researches were published and translated into many languages, no practical use was made of his discovery for almost fifty years.

In 1844 Colton was traveling about from town to town entertaining audiences with mystic semiscientific séances. At one of these, Wells witnessed the anesthetic properties of nitrous oxide, saw its possibilities, and exclaimed—"A new era in tooth pulling!" He had Colton administer the gas to him for the extraction of a maxillary molar. He administered it to over a dozen of his patients. In the spirit of a missionary he traveled to Boston to demonstrate the discovery before the famous surgeon, Warren. Unfortunately the mask was removed too soon and a terrible shriek rent the air as Wells applied the forceps. A group of students who looked on, booed and hooted.

In 1860 and again in 1864 after N_2O had already been given in over one thousand cases, and at the very time that its properties were being demonstrated in dental societies, Ziegler writing in the *Dental Cosmos* foretold the most horrible effects from its use.

George J. Ziegler, July, 1860, in the *Dental Cosmos*, Vol. I, No. 12—"Wells was unfortunate in the selection of the proper agent—N_2O (for anesthesia). It is doubtful whether this agent will produce anesthesia at all."

Again in 1864 the *Dental Cosmos*, Vol. V, No. 5. "Principally by superoxidation and overstimulation the protoxide of nitrogen may cause excessive disintegration and undue waste as well as abnormal excitement of the system, even to destructive softening of the brain, nerve tissue and other important structures, it may give rise to rupture of the heart and blood vessels or disruption and other mechanical derangements of important parts of the organism."

Progress of practical importance came with the establishment by Colton of dental offices for extraction with the use of nitrous oxide in New York and in many other cities. In a few years Colton reported success in over 100,000 cases. Others, naturally, followed his lead. In 1868, Andrews of Chicago demonstrated the use of nitrous oxide with oxygen for prolonged anesthesia in surgery.

In our own time Sir Frederick Hewitt probably more than anyone else, has made the most important researches in the use of nitrous oxide and oxygen under low pressure with or without ether or synergistic anesthesia in oral and general surgery.

GAS-OXYGEN APPARATUS

Gases for general anesthesia are manufactured in tanks under high pressure. These gases are to be delivered to the patient under ordinary or slightly increased atmospheric pressure. All apparatus on the market today for gas anesthesia is simple. The Heidbrink is no more complicated than the S. S. White or the S. S. White than the McKesson or the McKesson than the Gwathmey. Their complexity is only apparent. The function of a gas apparatus is to deliver to the patient gases under low pressure from tanks containing gases under high pressure, and to allow of an easy change in the proportions of the various gases delivered. The bags and the piping of an apparatus should be considered merely an extension of the patient's lungs. As I stand here and talk the air I am breathing in is spoken of as the tidal and complemental air. These gases pass into the lungs and mix with the reserve and the residual air in the alveoli of the lungs. Separating the blood, coursing within the luxurious capillary network which studs each air cell, from the gases is the very thin flattened cell of the air cell and the thin endothelium of the capillary. The surface over which the gases in the lungs come in almost contact with the blood of the capillaries is over 100 times the surface of the body. The venous blood of the pulmonary arteries absorbs the ethylene, nitrous oxide and oxygen from the air cells. The blood stream passes to the heart by way of the pulmonary veins and is sent out to the entire body. All the body cells within thirty-two seconds—the time taken to make a complete blood circuit—sense the change in the new gaseous diet. Instead of N—80 per cent and O—20 per cent, they are getting perhaps, ethylene—60 per cent, N_2O—25 per cent—O—15 per cent, which has been mixed with the reserve and residual air in the lungs. After a few breaths every cell in the body will receive about the same proportion of gases as we have delivered them to the gas bag. The specific action of the gases is exerted upon the brain cells. The highest or mental center is the first to be affected by the changes in the gaseous diet, and is the first to succumb. The lowest or vital center is the last to be affected. This we explain by saying that the nerve tissue, the last tissue developed in the stages of evolution requires about twice as much oxygen as the other tissues.

The apparatus for nitrous oxide and oxygen, of course, will not differ from the apparatus for ethylene and oxygen. An apparatus for the three gases will merely have an added intake tube. What do we demand of an apparatus? (a) The machine must allow us to obtain *with ease* a regular flow of the gases in the proportions we want them. (b) With ease, at a glance, both the operator and the anesthetist should be able to determine the proportion of the gases delivered. (c) In the course of the gases, we must have a container for adding to the gases whatever vapor (ether, paraldehyde, urethane) we may consider advisable in the given case.

PREPARATION OF THE PATIENT

The toilet necessities are attended to. Collar or corset are removed and the clothing so arranged as not to interfere with the breathing. Appliances such as hernia belts should not be removed. The position of the head should be such as not to produce undue strain of the muscles—the head should be parallel to but *not* in line with, the back and shoulders. We all stoop; the older the patient the greater the stoop and the more will the head be forward of the shoulders.

Questions as to the health, references to heart disease, stethoscopic examination, generally speaking, produce more harm than good. If the patient can visit you, ethylene, nitrous oxide and oxygen properly administered will not be contraindicated.

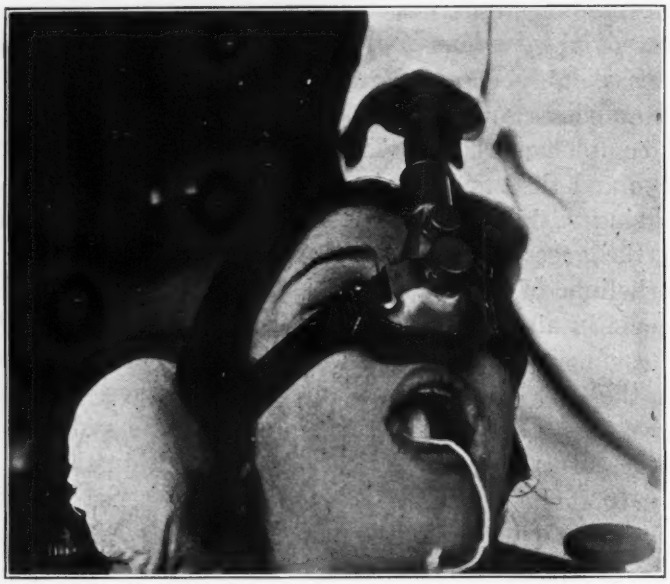

Fig. 1.—The position of the nose piece, the mouth prop and of the pharyngeal pack. The pack is closely adapted between the back of the tongue and the soft palate to cut off ingress of air through the mouth as the patient breathes the anesthetic through the nose. The pharyngeal pack also protects the patient against the entrance of blood or foreign particles into the lungs or esophagus.

Our usual routine is to have the patient's friend, if patient is not alone, in the operating room with him. It reassures him as does your good cheer, your smile, your confidence, and as does the smile of the patient who has just come out of the operating room.

We are believers in "stage-play" or suggestion—whatever you may call it. The sterile instruments in a sterile towel have been laid out, if possible before the patient enters the room. You speak your few lines, your nurse speaks her few lines, words that you have probably repeated ten times already that day—words to calm, to comfort and to reassure—words giving ease, good cheer, and confidence to the patient. After a few inhalations, by a sign of your hand and eyes you ask the patient's friend to pass back into the waiting room. *At the beginning* of the inhalation, words of commendation and reassurance are in place. The tone is more important than the

comment. It should be soothing; your voice and words can be made reassuring, hypnotic. A proper choice of words suiting the occasion can surely be made of value. "Breathe easily, normally." "Think of something happy, happy." "You are a very good patient." "You are the best patient I have had."

The aim is quiet and not labored breathing. The average patient takes ethylene, nitrous oxide and oxygen without trouble but the anesthetist should never assume that trouble may not come. Transient cyanosis during induction cannot always be avoided but should never be allowed after anesthesia is established. Foresee what the effects of the administrations at one moment will be some moments later. The anesthetist must remember that the control of the gas taps does not at once control the gas supply in the blood. The gases that you feed through the cylinder taps at any moment is not what the patient's tissues and lungs are receiving at that same moment, nor does it even determine the combination of gases in the rubber bag. The anesthetist must be able to judge what the effect of the mixture he is giving

Fig. 2.—To indicate the use of mouth props. When the four first molars are to be extracted, the usual mouth prop is placed on the right side. The left molars are removed, the Mason gag is inserted on the left side and the right gag removed and teeth extracted upon that side.

at one moment will be a few moments later. He must remember that the effect upon the patient at the moment he is turning the taps is a result of what the patient's tissues received a little while ago.

END OF ANESTHESIA

Do not slap the patient or shout at him, "Wake up!" Do not attempt to pull out the prop as he may think you are pulling a tooth. You have attempted to give him an anesthesia simulating natural sleep. In natural sleep you awaken quietly, slowly, serenely, peacefully, calmly. Let the patient return to full consciousness as serenely, calmly.

At the completion of the operation the gases are cut down slowly. By the attached string you remove the gauze packing in the back of the mouth and replace it with another similar packing. You swab out the mouth with sterile gauze and place a gauze pack over the area. The O is being continued for a while. The patient is regaining full consciousness. You ask him not

to soil his clothing, to spit into the basin which is held at his chin. You ask him to push out the mouthprop with his tongue. If he is attempting to remove the prop but appears to have difficulty you ask, "Shall I help you?" and slowly and gently disengage the prop. We have once before emphasized our opinion that rinsing is not indicated. It is merely a tradition the patient has inherited. Generally he should be told not to rinse for about two hours after the operation. We shall repeat what we once before said about hemorrhage. We believe more cases of hemorrhage after extraction are caused by two things than by all other factors. What are they? (1) Dis-

Fig. 3.—When the anesthesia is over, let the patient awaken slowly, calmly, serenely. Don't slap the patient. Don't shout "Wake up," and above all, do not acquiesce in the patient's desire to rinse. Rinsing is a tradition passed on from patient to patient and from patient to dentist.

turbance at end of an extraction in superfluous rinsing. (2) Disturbance of the wound one or two days later in removing the grayish film over the wound, or in probing the area of extraction.

TECHNIC

(Revue De Stomatologue, 1921)

"Patient asked to breathe deeply (*largement*). When a slight snoring indicates that the patient is asleep, oxygen is given in small doses—just enough to avoid cyanosis. If patient appears to awaken pure N_2O is given again and so on."

We well remember that when we first used the Long apparatus our instructions to the patient were, "Now breathe deeply." There was no reason for that injunction then and there is no reason for it today. The aim should be

to allow the body to slowly accustom itself to the new condition—the continuation of body processes with ethylene, nitrous oxide, and oxygen instead of with N and O. We therefore commence with air alone and gradually pass to N_2O and O. This will effect two things. First it will permit the system to accustom itself to the new conditions. Second, it will reduce possible shock. As to the mixture of gases advocated by our friends: Are they advocating an intermittent anesthesia and one where the ratios are constantly changing?

REBREATHING

We can have the patient breathe from and into the bag. In that case the air which he exhales returns to the bag, and at the next inspiration he will breathe it again. Thus the CO_2 manufactured by the body metabolism is breathed in by the patient and acts upon his respiratory center to increase its rate. By slightly turning a disc on the valve box a communication of the bag and nose piece with the air is established so that the air exhaled by a patient passes into the atmosphere.

In a room with windows closed and no ventilation, the CO_2 increases. For a long time it was believed that this gas was the cause of the disagreeable sensations but it is now known that it is due to the increased moisture, temperature and by-products of perspiration. Let it be definitely understood that air which we exhale is not poisonous. Exhaled CO_2 will not become offensive until it is sufficiently concentrated to stimulate the respiration to greater frequency than normal—concentration 4 per cent. When the concentration has reached 10 per cent, distress and dyspnea (labored breathing) will result.

The inhalation of CO_2 is not influenced by the percentage of O in the hemoglobin, but an increased amount of CO_2 appears to stimulate the passage of O to the tissues. The good effects of rebreathing arise from the presence of CO_2 in the blood. The CO_2 stimulates the oxyhemoglobin to give up its O which passes to the tissues and so promote oxygenation of the tissues.

Cyanosis does not depend upon the amount of CO_2 in the blood. Oxyhemoglobin gives the blood its characteristic color.

Flagg: "The sicker, the more septic a patient is, the more are closed methods indicated. In such cases rebreathing with O almost always appears to improve the general condition. The advantage of the closed method, and the rebreathing which it implies, may be explained by the fact that oxyhemoglobin dissociates more readily in the presence of abundant CO_2.

What are the objections to this form of anesthesia? A constantly variable mixture produces a constantly variable anesthesia. A mixture proportioned to the patient gives a smooth anesthesia.

PREGNANCY

During pregnancy the patient should be operated upon if necessary. With proper anesthesia there is no danger to the fetus or to the mother. It is better to remove pain than to have the patient suffer—this applies both to the anesthesia and to the need for operation in extraction and oral surgery.

Of all general anesthetics, ethylene, N_2O and O may be given following the usual precautions. Undue muscular movements, struggling, excitation must be avoided. The diet should be considered. We wish to avoid retching, and straining, as in an attempt to vomit or in vomiting.

MENSTRUATION

If the operation is not urgent postpone it. We have frequently been forced, out of necessity, to operate during the patient's menses. We have never had any untoward symptoms, but we have been told that even a slight operation may bring unusual symptoms.

WHAT THEORY SQUARES WITH THE FACTS?

1. The air is a physical mixture of N—79 per cent, and O—20 per cent. The blood takes up this mixture. The N as it passes through the body undergoes no chemical change.

2. N_2O and O are coursed through the body by the blood. The N_2O undergoes no chemical change in the blood or in the tissues. The same is true of ethylene, and of acetylene.

3. N has a low power of saturation with water or blood—4 volume per cent.

4. The saturability of N_2O in water or blood is much higher than that of N. N_2O about 50 volume per cent. Ethylene and acetylene have a still higher saturability.

5. In the stages of development nerve tissue is the last tissue developed. To function in the animal or human body it requires much more oxygen than the other tissues—twice as much. When the O supply is below normal the higher mental centers are the first to be affected, and the vital tissues the last. In the average N_2O and O anesthesia, the O supply is reduced to less than half the normal. The margin of safety is about 2 per cent; the vital processes cannot continue in the average human on less than 6 per cent O (Greene).

6. From the above we may present an apparently workable theory. Anesthesia is produced with N_2O and O through the reduction of the O supply sufficiently to affect consciousness, pain apperception and pain perception. The O must be in sufficient quantity for the respiratory and cardiac function to continue.

7. With ethylene and acetylene instead of N_2O what happens to our above theory—a theory we might extend to explain local anesthesia (reduction of O supply to the nerve endings)? With ethylene the O supply is equal to nearly that in the air. With acetylene the O supply is never less than 30 per cent and usually above 40 per cent (Wieland and Gauss).

DEPARTMENT OF
DENTAL AND ORAL RADIOGRAPHY

Edited By
Clarence O. Simpson, M.D., D.D.S., F.A.C.D.,
and Howard R. Raper, D.D.S., F.A.C.D.

RADIOGRAPHY IN ORTHODONTIA AS RELATED TO IMPACTIONS*

By Clinton C. Howard, D.D.S., Atlanta, Georgia

THE use of the x-ray has become a part of daily routine in the practice of orthodontics. It is an indispensable assistance in establishing the existence of supernumerary teeth, the presence of impacted teeth, the status of congenitally missing teeth, as well as other important information impossible to ascertain by a clinical examination.

Your essayist, in presenting this short treatise, particularly desires to direct your attention to the assistance of radiography in formulating a prognosis in all phases of impactions.

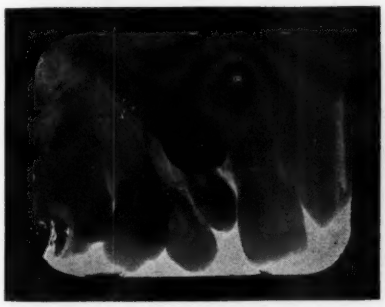

Fig. 1.

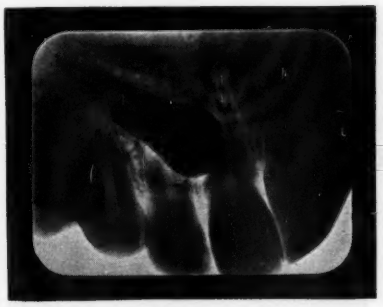

Fig. 2

In Fig. 1, is illustrated what might be termed a "simple impaction." The long axis of the tooth lies in the proper avenue of eruption. Its failure to assume its functional placement is due to an insufficient space between the crowns of its adjacent members. Should the space be created by orthodontic means, we might, if denied a radiogram, expect this impaction to continue its eruption without any extraneous aid. On examining the picture, we see

*Read before the Meeting of the American Society of Dental Radiographers, November 8, 1924, Dallas, Texas.

Radiograms of Fig. 9, by C. F. Chandler, Figs. 4, 5, 6, 7 and 8 by Dr. J. R. Mitchell. Figs. 10, 11, 12 by Dr. P. H. Jones.

that the development of the root is complete and therefore the only tangible force of crown eruption has been expended. The prognosis for further eruption is unfavorable unless orthodontic influence is directly applied.

In Fig. 2 is pictured a not uncommon impaction. The clinical requirements in placing this tooth in its proper position demand no extraordinary skill. The prognosis of pulp vitality after the completion of tooth movement is largely dependent upon our knowledge of the root development. If, by

Fig. 3.

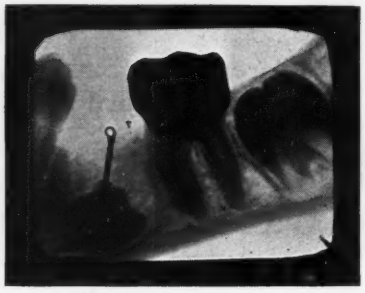

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

the x-ray, we see a complete apical formation and therefore a small opening for blood vessels, our chances for maintaining a healthy pulp are less favorable than in a case (Fig. 3) where the apical opening is funnel-shaped and thus permits a copious blood supply. Orthodontic pressure in the case of Fig. 2 should be most carefully and delicately applied, otherwise the death of the pulp may ensue.

The most severe impaction which I have ever been called upon to correct is presented in Fig. 4 which shows a mandibular right second premolar.

You will note the relative position of the crown to the end of the anterior root of the mandibular first molar. Also please observe the progress of root formation. The succeeding Figs. 5, 6, 7, 8 and 9 represent the progress of tooth movement. These were made at each visit, which were at intervals of from two to two and a half months. By comparing Figs. 4 and 9 we must agree that

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

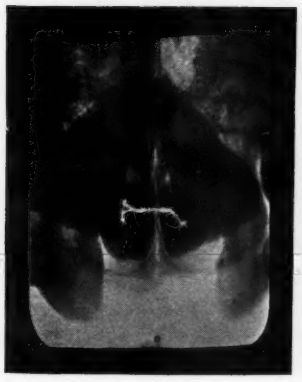

Fig. 14.

it is orthodontically possible to move an impacted tooth the distance of three-fourths of an inch, without interfering with its root formation. Without the x-ray this histologic fact would remain unrecorded and indeed a valuable guide in future work would still be a hidden secret.

In Figs. 10, 11 and 12 is presented a similar impaction which is now under treatment. Its progress, as illustrated by comparing Figs. 10 and 12 warrants a favorable result.

In the past few months two rather unusual cases of impactions of the central incisors have been presented for relief. The ages of the children in these cases ranged from nine to twelve years, therefore the extreme tardiness in the eruption of the permanent central incisors was, from a clinical examination, rather perplexing. The radiograms, Figs. 13 and 14, illustrate most forcibly the value of the x-ray in diagnosing such cases. The pictures disclose a supernumerary bud lingual to the crown of each unerupted incisor. Again the radiogram transformed a difficult problem to a simple one.

Your particular field of study is an indispensable adjunct to an orthodontic practice. Through the advanced teachings of such men as are represented in this audience, we are taught the fine points of interpretation which permit the perfect location of any impacted tooth. By intelligently directing the angle of the ray we can, by comparing previous radiograms, correctly record the actual progress of a moving impacted tooth.

Our specialty, orthodontia, owes much to you as a group of earnest students. Please accept our gratitude for the fruits of your labors which have added so materially to the efficiency of our endeavors.

ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

A Surgeon on Oral Sepsis. Willy Meyer (New York). The Dental Digest, September, 1924, xxx, 9.

The pioneer work of Billings and others before the World War, together with the experiences during the latter, have served to bring the surgeon and dentist in closer touch. The new teachings concerning oral sepsis were naturally carried by their enthusiastic disciples to an extreme, until we began to seek the presence of a purulent focus to explain almost the whole of pathology. One ill effect was the indiscriminate sacrifice of human teeth. Disenlightenment followed, for the patient often not only lost his teeth but still retained the disease for the cure of which they had been sacrificed. Unwelcome collateral results followed the radical removal of tonsils and adenoids, such as increased numbers of acute pulmonary abscesses. In making a diagnosis of infected teeth and tonsils indiscriminately, the refinements of differential diagnosis were often ignored as in the following case. A patient in good general health and vigor after having sustained a tumble was found to limp painfully and the diagnosis was made of chronic arthritis of the hip joint. As his teeth were in bad shape and needed attention for themselves it was thought wise to extract them. There was no resulting improvement in the joint and the mobilization of diagnostic resources brought to light an impacted consolidated crack in the femur neck. He was helped by orthopedic devices to compensate for the shortening and made a fair recovery.

While the pendulum is swinging back none of the gains have been lost, and we still search for possible focal infection in obscure cases. Even if not the sole or dominant causal factor, an infected tooth may contribute to the totality of an infection. Clean mouths are a hygienic necessity for as Black has shown the mouth always grows worse with years and after the age of fifty there are no longer any aseptic mouths. The article by Dr. Meyer will be continued.

Dietary Deficiencies and Dental Abnormalities. B. B. Jones (Richmond). Dental Items of Interest, September, 1924, xlvi, 9.

A direct connection between these two entities has hardly yet been traced although the relationship between defective diet and diseased gums has long been known. Recently Gerstenberger seems to have shown that aphthous stomatitis is due likewise to scantiness of B vitamine for he cures it with yeast and tomato juice. McCollum's discovery of the D vitamine and its

relation to rickets is a step in the right direction, although as yet we cannot state truthfully that deficiency in this principle is straightway responsible for definite dental anomalies. The causation of rickets is extremely complex and closely bound up in lack of fresh air, sunlight and exercise as well as defective diet. The teeth of rickets show no definite alterations although they are apt to appear tardily and to be more prone to early decay than those of nonrachitic children. Nevertheless caries is a disease which attacks nearly all children without respect to the presence or absence of rickets. Attempts at the wholesale prevention of caries in school children have shown that a satisfactory diet is insufficient in itself to arrest this condition. Nevertheless we should continue to provide the proper diet in the hope that in the long run the results will be cumulative for good. We know that certain primitive peoples of today who have always been free from caries begin to develop the latter as soon as they adopt the diet and civilized ways of the white man. It is possible that the school age represents too late a period to revise the diet and that the mischief is done through improper feeding in infancy and early childhood. The best outlook for the future may lie in giving at these early years the so-called protective foods which guarantee both the vitamine and mineral content. The mother should diet during the antenatal period as well.

Teeth and Sex. T. Dobkovsky (Leipzig). Zahnaerztliche Rundschau, August 31, 1924, xxx, No. 35.

The author has studied this subject in the Orthodontic Laboratory of the University of Leipzig under Professor Pfaff, with special emphasis on cases of sex confusion—effeminate men and masculine women; his object being to determine whether the teeth are in any sense a secondary sexual characteristic like the hair, the fat distribution, etc. It is generally admitted that sex differences are normally present to some extent—thus males have much larger canine teeth than females. In general the incisors as a whole are larger in the male. In the bicuspids and molars the differences are much less striking. We may therefore speak of male and female dentition types, although a woman with a male type of teeth is not at once to be set down as inclined to masculinism.

The author investigated 132 cases of so-called homosexualism in which the sex was physically inverted irrespective of physical peculiarities. He selected for study those who also presented the physical habitus of the opposite sex. He made elaborate control measurements of the first and second incisors and canines of both upper and lower jaws of 100 normal men and 100 normal women, and then having made similar measurements of a large number of markedly effeminate men he was able to show that the average size of these teeth was intermediate between that of normal men and normal women. Naturally the differences, which are present only as millimeter-tenths, are very slight. The discovery, if such it may be termed, is of little practical value, although the author suggests that since these teeth are all developed before puberty we may be enabled at times to forecast the likelihood that a boy will become effeminate during adolescence, or a girl prove to be of the virago type.

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EDITORIALS

The Dallas Meeting of the American Dental Association

THE 1924 session of the American Dental Association is a matter of history and from the standpoint of success, ranks well with any of the other meetings. It is true the attendance was not so great at Dallas as it was at Cleveland, but no one expected it to be. However, we believe the American Dental Association rendered a valuable service to the profession by meeting in Dallas because it enabled many men who had not previously done so, to attend a large meeting of organized dentistry. It is our opinion that these men will have greater enthusiasm and appreciation for their profession than before and we believe that it is the duty of the American Dental Association to render service as far as possible to the entire membership and to the constituent societies. This belief is also held by the president, Dr. C. N. Johnson,

as stated shortly after the close of the Dallas meeting. However, some of the drawbacks of this meeting which can be remedied in the future are worth consideration.

A plan should be followed whereby the choice of a meeting place, as well as the arrangements for the meeting, can be carefully worked out. This statement is made without criticism of the Dallas meeting or the local committees that had charge of affairs. There remain certain outstanding facts which must be considered and met regardless of sentiment. One of the most important things for the success of the sessions of the American Dental Association is that the various sections may be provided with suitable meeting rooms. These rooms should be so arranged that each section will have a quiet place in which to hold its meeting. Several years ago when the meeting of the Society was held in Boston, the sections had deplorable meeting places, because of the arrangement of the hall. There was so much noise and confusion that the essayists of the various sections had difficulty in presenting their papers, and the noise from one section was transmitted to the section in the adjoining room. In the light of this experience at Boston, we find that exactly the same mistake was made at Dallas. Someone in charge of arrangements should see that such mistakes do not occur again.

A more satisfactory management of the meetings of the Society could be attained if all local arrangements were made by a business manager or someone from the dental secretary's office or someone authorized by the Board of Trustees. We know from conversation with men who serve on local committees that arranging for a meeting of the American Dental Association is a laborious task and consumes much of the time of the dental profession in the city where the meeting is held. This entire work should not be thrown upon these men. The Society has enough funds to provide a business manager who could arrange all details, thus relieving the profession of the convention city of that responsibility. The dental profession is beginning to realize that arranging for a meeting of the American Dental Association presents real difficulties and hard work. We attribute to this the fact that only one city requested the meeting of the Society in 1926.

The Board of Trustees should exercise their authority in regard to arrangements for the meeting place, and when conditions arise such as arose in Dallas, we believe it would be wise to change the meeting place to some other town. We refer to conditions over which the dental profession of Dallas had no control, namely, the fact that after the American Dental Association voted to go to Dallas, two of the largest hotels were demolished for the purpose of rebuilding. Probably the dental profession in Dallas would have much preferred to postpone the meeting until 1927 when hotel accommodation would have been improved. However, true to the Texas spirit, the dental profession of Dallas offered no objection or suggestion in regard to changing the place of the meeting, although conditions had arisen in the interval between the invitation and the meeting which made it difficult to satisfactorily manage the meeting.

It has also been known that in certain cities elected by the American Dental Associaiton for their meeting, the hotels have increased room rates

during the session. If the Board of Trustees finds that the tendency of hotels is to increase rates during conventions, it is our opinion that the meeting should be held in some other city. This authority is given to members of the Board of Trustees by the by-laws. There are but few cities in the United States that can satisfactorily handle the meetings of the Society, and in our opinion it would be much better to carefully select the meeting places rather than to follow the plan of the past in going to such cities as extend invitations. These suggestions are made because of past experiences. If the Society is going to be all it should be, it must be willing to learn from past experiences and not continue to follow a plan which has produced so many objectionable features.

Increase in Subscription Price

On account of the necessity of having to increase the size of the INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY in order to take care of the material submitted for publication and on account of the continued increase in the production costs, the publishers have found it necessary to raise the subscription price of the Journal beginning January, 1925, to $7.00.

ORTHODONTIC NEWS AND NOTES

Chicago Dental Society Midwinter Clinic and Meeting

January 21, 22 and 23, 1925, are the dates on which the Chicago Dental Society will hold its annual midwinter clinic and meeting at the Hotel Drake.

The program is practically completed. It covers all phases of dentistry, and will appeal to the specialist as well as to the general practitioner. Many men, new to Chicago Society audiences, will appear in the scientific and technical sections.

More exhibit space has been reserved than ever before, which insures a most comprehensive display of dental equipment and merchandise.

All members of the American Dental Association are cordially invited to attend. Reduced railroad rates will be available.—M. M. Printz, Secretary, 25 E. Washington Street.

American Society of Orthodontists

The Twenty-fourth Annual Meeting of the American Society of Orthodontists will be held in the new Atlanta-Biltmore Hotel, at Atlanta, Ga., April 14, 15, 16 and 17, 1925. (Mark off the date now.)

Walter H. Ellis, Sec'y-Treas.,
397 Delaware Avenue,
Buffalo, N. Y.

Clinton C. Howard, President,
Doctors Building,
Atlanta, Ga.

Items of Interest

Dr. Geneva E. Groth, formerly associated with Dr. S. M. Weeks, announces the opening of her office, 1610 Spruce Street, Philadelphia, Pa. Practice limited to orthodontia.

Dr. Douglas B. Parker announces the removal of his office from Brooklyn to 121 East 60th Street, New York City. Practice limited to oral and plastic surgery.

Dr. Joseph D. Eby announces the removal of his office from 54 East 62nd Street to 121 East 60th Street, New York City. Practice limited to dental orthopedics.

Dr. Charles A. Spahn announces the removal of his office from 753 Fifth Avenue to 121 East 60th Street, New York City. Practice limited to dental orthopedics.

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